

The Commercial Car Journal

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Announcing—

The First of a Series of Vocational Studies of Truck Use Which Every Salesman Should Read

THE salesman who knows his prospect's business has the bulge on competition—and that knowledge is the basis of vocational selling of motor trucks.

For the salesmen to get this intimate information regarding the various vocations using trucks is not simple, as he is judged not on the basis of what he knows but on the orders he produces. His efforts to study along vocational lines must be sandwiched into his work of producing a consistent volume of sales.

To facilitate this study on the part of salesmen, COMMERCIAL CAR JOURNAL introduces the first of a series of studies of the various major vocations using trucks, which will appear from time to time in the future. The first of these studies begins on Page 10 of this number and deals with department store delivery. It is written by Arthur W. Einstein, formerly manager of the Retail Delivery Association, who probably has as broad a knowledge of the transportation problems in this field as any man in the country.

These studies will be brief, necessarily, but in them an effort will be made to bring out the major features of the different vocations of direct interest to truck salesmen. They will provide information which it would take the individual considerable time to dig out for himself and this information can be used as a basis for a more detailed study by the men on the firing line. We feel sure that salesmen who read and digest these studies as they appear in COMMERCIAL CAR JOURNAL will gain a clearer picture of the business of his prospects in the vocations considered and will be better able to talk their language.

The possibilities inherent in the vocational plan of selling motor trucks are being exploited more aggressively at the present time than ever before in the history of our industry. Many of the important truck

manufacturers are carrying on extensive sales promotion campaigns based on the vocational idea, and dealers and branches are synchronizing their sales effort with these campaigns.

Vocational selling is not a new idea for the truck industry. It probably had its genesis a decade or more back in an effort to secure more effective coverage of the market for motor trucks. Many prospects were not being made the subject of sales effort largely because the direction of such sales effort was not based on an organized plan.

To meet this condition careful analyses were made of the use of trucks at that time and, as a result, a vocational classification was developed showing the various lines of business needing truck transportation. This classification was then made the basis of a study of the market possibilities in each territory. All the grocers, all the plumbers, all the laundries, etc., in a territory were listed under the respective headings in the vocational classification. In this way a rather complete list of probable users of trucks was obtained and this list formed the basis for sales effort. This procedure amounted to fine-combing the territory and assured practically 100 per cent identification of all the probable or possible users of trucks.

This, however, is not the whole story of vocational selling, particularly as it is being practiced today. Securing complete territorial coverage still is an important feature of the plan but much emphasis at the present time also is being placed on the importance of studying the requirements and peculiarities of the various vocations to obtain knowledge that can be used effectively in selling. This phase of vocational selling which is being stressed so strongly at this time, is simply a recognition of the fact that the salesman who knows his prospect's business has the bulge on competition.

Department Store Delivery—the First of the Series—Starts on the Next Page

Department St

I 'LL take that. Send it to" The salesperson across the counter from the customer who has just made a purchase, notes down the name and address. The next day, or perhaps even the same day, the purchase is delivered at the customer's home. Multiply this transaction by anywhere from 10,000 to 110,000 and you'll have an idea of the job the delivery division of a large department store faces daily.

How this job is handled is of very definite interest to the truck trade not merely because the motor truck plays an important part in its accomplishment but also because an appreciation of the prospect's problems and objectives is one of the fundamentals of successful selling. Consequently in discussing department store delivery at the request of COMMERCIAL CAR JOURNAL, I am doing so with the thought that the information will assist the trade in selling this important class of truck buyers. Most salesmen will acknowledge how valuable it is to them in their sales work to know something about the prospect's business and to be able to talk his language.

Perhaps the best way to define what delivery includes in the department store field is to indicate what elements of expense are accumulated under this heading. Delivery expense starts as soon as the merchandise has been packed or wrapped, and ends with the delivery to the customer. This complete function is known as total delivery which is sub-divided into internal and external delivery.

Internal delivery starts with the wrapped package and ends when it reaches the truck. External delivery commences when the driver takes possession of the packages and is completed by their delivery to customers or return to the store. Expenses charged to external delivery include drivers' and helpers' wages, supervision, maintenance of vehicles, depreciation of plant and equipment, supplies including gas and electricity, oil and tires, interest, insurance, taxes, vehicle licenses, etc. Of the total delivery expense, internal delivery usually represents about one-third and external delivery about two-thirds, this rough rule naturally being subject to considerable variation.

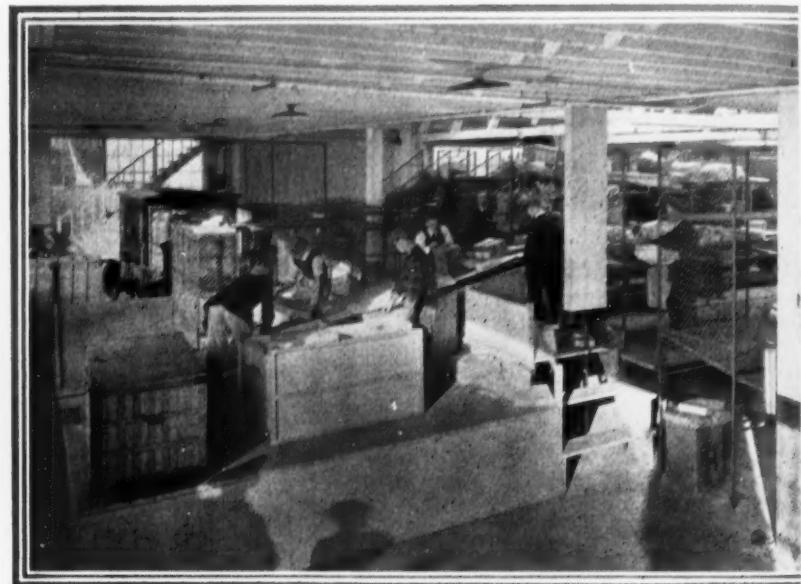
Department stores regard delivery as a service expense even though it always is an important factor in building or breaking-down store prestige and good-will. It is important for the motor truck salesman to recognize this fact because the buyer's attitude toward an expenditure which he considers a service expense, is likely to be quite different from the one he has toward a purchase that he classifies mentally as a direct merchandising cost; it is like productive and non-productive time in the service station.

It is impossible to generalize on department store delivery expense because neither store policies nor the areas they serve are standardized. One store may school its employees to ask the customer tactfully to take the package with her and as a result, deliver only 10 or 15 per cent of its sales. Another store in the same city may deliver 30 to 50 per cent of its trans-

A Study of the Delivery Vocation Written for

By Arthur

Formerly Manager of the



A scene in a large delivery depot. The truck carrying the packages are then routed, placed on the belt, transferred to the sheetwriters' right the drivers

actions because its employees are not similarly schooled.

As a result, in the first case, delivery expense may be less than 1 per cent of gross sales, while in the second it may run from 1½ to 2½ per cent. Moreover, one store may carry charge accounts and another sell for cash only. In the latter case, a much higher percentage of C.O.D.'s would have to be delivered and, inasmuch as a C.O.D. stop takes longer, the delivery cost naturally is higher, as the driver can make fewer stops per day. Furthermore one store may limit its delivery service to a relatively small area around the store while another may deliver any place within a radius of 50 to 75 miles. As a general rule, however, department store delivery expense will run approximately from 1 to 1½ per cent of gross sales.

In making cost comparisons, department stores usually talk in terms of cost per package delivered. Naturally it makes quite a difference whether, in figuring the average cost per package, both internal and external delivery expense is included, or only the external delivery expense considered. Also, in a specific instance, what the cost per package is depends on individual conditions. If delivery service is provided over a relatively small area around the store with all routes showing a large number of stops per mile, the cost per

ore Delivery

Problem of This Important the Truck Salesman

W. Einstein

Retail Delivery Association



from the store to the depot is shown in the left background. They bins, necessary records made and end up in the drivers' bins. At the are shown loading

package obviously will be less than will be the case where a store delivers not only in the city but also in a large suburban territory. Under the latter conditions, the deliveries per mile will be much fewer and the cost per package higher. Moreover topographical and traffic conditions vary in different cities and these affect costs. Consequently some stores will show an average per package cost as low as five cents for EXTERNAL delivery only, while others may have an EXTERNAL package cost of 18 cents or more.

When considering delivery expense, it is essential to think of both the percentage of this expense to sales and the per package cost. Either one alone does not tell the entire story. The per package cost is a measure of the production efficiency of the delivery department while the percentage cost reveals the effect of the store's delivery policy and is used when figuring overhead.

The extent and character of the delivery department organization varies widely in different stores. It may be headed by a transportation or delivery manager who has under him a delivery superintendent responsible for internal delivery, and a garage superintendent who has jurisdiction over the vehicles and the garage. In any case it is important for the salesman to determine who the responsible delivery executives are in each case

as it is necessary to sell them to get the order. Those executives who are directly responsible for truck operation and maintenance usually are the only ones in the store organization who understand the mechanical details and niceties of truck design and who are likely to show very much interest in these features.

In addition to the delivery executives, however, it is usually necessary to sell a number of other executives. These include the store manager, who is responsible for all service expense; the purchasing agent, because it is his function to buy all store equipment and supplies;

sometimes the controller, because he is interested in controlling expense; and even the president or general manager. The fact that these higher executives are a factor in the purchase of motor trucks does not indicate any lack of confidence in the delivery executives, but rather that they like to keep in touch with what is going on under them, particularly when as large a purchase as one or more trucks is under consideration.

In dealing with the garage superintendent, the transportation manager, the shipping room superintendent, the store manager, the purchasing agent, the controller or the president of the company, it is necessary for the salesman to study each executive to discover exactly what part of the deal interests him. The president may be interested only in the appearance of the fleet; therefore talk art or color scheme to him, etc. The controller is interested in decreasing expense and is naturally concerned with economy. A study of each executive to determine which phase of the transaction interests him most will help materially in getting the order.

Department store men classify the merchandise to be delivered as packages, bulk and furniture. The term "package" is largely

self-explanatory although some stores limit it to items of 2 cu. ft. or less volume. Bulk consists of items having a volume of more than 2 cu. ft. or thereabouts and consists largely of house-furnishings other than furniture.

Because of the diverse types of merchandise to be delivered, department stores use a wide variety of motor truck equipment. For package loads, a truck rated at from $\frac{1}{2}$ to $\frac{3}{4}$ -ton capacity equipped with panel or screen-side body is suitable. The loads it will be called upon to carry will seldom exceed 500 lb. in weight and will consist of from 50 to 200 packages. Bodies used in this service should have a loading space of from 6 to $7\frac{1}{2}$ ft. In the panel type, a dome-light is desirable to provide illumination for sorting the load, particularly in the winter months when it gets dark early. A low-loading height is preferable and rectangular wheel-houses are more desirable than the curved type, as with the former the load can be packed more securely with consequent reduction in damage and breakage. The body should be designed to provide easy entrance and exit for the driver, as this reduces the time per stop and makes the work less tiring, and if the load is to be worked from the front, consideration should be given to the ease with which the driver can get to the load.

For combination package and bulk loads, $\frac{3}{4}$ to $1\frac{1}{4}$ ton trucks are used with a loading space behind the driver's seat of $8\frac{1}{2}$ to $9\frac{1}{2}$ ft. The height should be not less than 5 ft., and preferably 5 ft. 8 in., and transversely the body should extend to the wheel hubs.

In view of the fact that the load on the delivery department may increase 100 per cent or more above average at Christmas, bodies of generous capacity have much to recommend them. They make it possible to



Electrics are widely used by department stores—a de luxe Walker model is shown above

increase the production per vehicle to meet the Christmas peak in part and result in more economical operation. Such bodies are not an invitation to overload, as department store delivery trucks ordinarily operate at loads which are but a fraction of their rated capacity.

Trucks used for furniture delivery, or for exclusive bulk delivery, or for combinations of furniture and bulk, have capacities of from $1\frac{1}{2}$ to 2 tons. The bodies may be of the panel type but for furniture delivery exclusively, there is a tendency to use an open body with 30 in. sides and a permanent top. The loading space behind the driver's seat ranges from 12 to 16 ft. with a popular average of 14 ft. because a 14 ft. body will hold about all the furniture which can be delivered in a day—about 60 pieces. Incidentally, a piece in the department store business does not mean an assembled unit necessarily. For example, a bed is considered as three pieces—headboard, footboard and side rails which are tied together. The width and height of these bodies should be at least six feet.

In addition to these types of trucks used for delivery of merchandise to customers, department stores employ other types of equipment for transporting merchandise to remote and sub-delivery stations, and for freight handling. The stores necessarily are located in high rent districts where the cost of a square foot of floor space is high. As they grow, more selling space must be provided and it is not always practicable to increase the size of the building. Even where the building can be enlarged, it is often more economical to take the delivery department out of the store building and place it in what is known as a "remote delivery station." This releases valuable selling space and at the same time provides delivery space in a lower rent area. Frequently, the remote delivery station occupies a

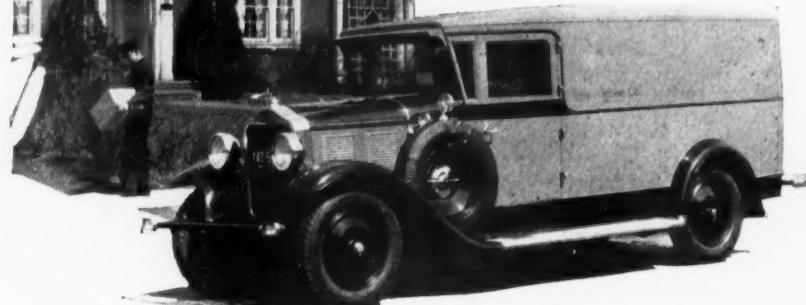
part of the space in a store's warehouse building.

When the remote station method is employed, provision must be made for transporting packages to it from the store. While trucks are used in this service, trailers and demountable bodies of the "Roloff" type are becoming popular, the choice between these two types of equipment depending on individual conditions. This type of equipment also is being used for transfer between warehouse and store. In this service, the demountable body can be placed on elevators, taken to any floor of the building and rolled to the most convenient loading position.

Sub-stations are employed where delivery is provided over a large area. They are spotted at strategic points and the merchandise to be delivered from them is transported from the store in trucks, trailers or demountable bodies. On arrival at the sub-station it is distributed to the various delivery trucks and carried to the customers. This plan increases the produc-



A de luxe panel delivery body on a White gasoline chassis



tion per delivery truck, as the long runs between the store and the delivery area are eliminated, thus enabling each truck to devote a larger proportion of the working day to actual delivery work. Moreover, by consolidating the packages for a number of routes served by the sub-station into one or more large loads, the merchandise can be transported from store to sub-station at an economical cost.

In addition to the various types of equipment which have been discussed so far, the store may have use for trucks ranging in capacity from $2\frac{1}{2}$ to 5 tons for hauling goods from the freight yards to the store and for transfer work between warehouse and store.

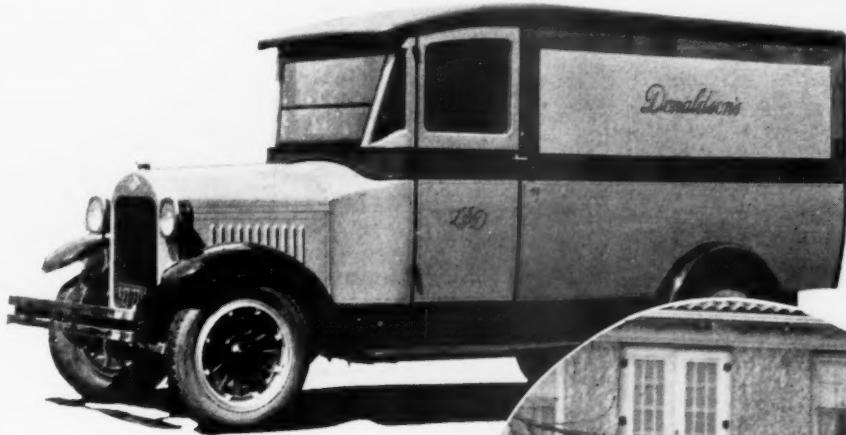
Turning now to the mechanism of delivery, the delivery superintendent is interested in wrapping and packing and, in some cases, he has supervision over this work. The reason for his interest is simple, for unless the wrapping and packing section works smoothly and according to schedule, the delivery department gets no packages and everyone works overtime. Moreover, if the wrapping and packing section fails to pack goods properly, the delivery section is blamed for breakage, which increases expenses.

The area over which the store provides delivery is divided up into units or routes which may be designated by number or by name. If packages are distributed to

the drivers' bins by means of a belt conveyor the routes will be numbered while if a sorting table is employed, names will probably be used to designate the routes. Belt conveyors are used for sorting in most large stores while the sorting table is employed in most small ones. There are, however, exceptions to this generalization.

When the belt conveyor is used, the router takes the package when it enters the delivery room, reads the address from the label pasted on it and writes the route number on it with a crayon. He then places the package on the belt conveyor. This operation is known as routing. The second delivery operation is sorting. At intervals of from 20 to 40 ft. alongside of the belt, "belt boys" are stationed whose job it is to take the packages from the belt and place them in bins known as sheet-writing or stubbing bins. Each belt boy has certain routes assigned to him and when he recognizes one of his route numbers on a package, he picks it off the belt and places it in the bin with the corresponding route number on it.

The third delivery operation is that of taking a written record of every package passing through the delivery room. One method is known as sheet-writing while another is known as stubbing. If sheet-writing is used, the package is taken from the bin by the sheet-writer, who copies on a large sheet the name and address of the customer, the department number of the store, the identification number of the salesperson who sold the merchandise, etc. The sheet-writer then places the package in the driver's bin. Stores with a large percentage of C.O.D. packages sometimes separate them from the paid and charge parcels to make it easy for the driver to check his load.



This Diamond T model is typical of delivery cars used by department stores

When stubbing is used instead of sheetwriting, the package comes to the delivery department with a piece of the sales check, known as the stub, attached to it. In this case, the router places the route number on the stub. This is done so that, if an error is made, the mistake can be caught easily by comparing the address with the route number. The belt boy takes the package from the belt and places it in the bin. The stubber, who takes the place of the sheet-writer in the stubbing system, removes the stub and puts it on a

spindle, the package then being placed in the driver's bin. Some stubbing operations include placing an identifying consecutive number on the package and on the stub to assist the driver to check his load so that no packages will be missed.

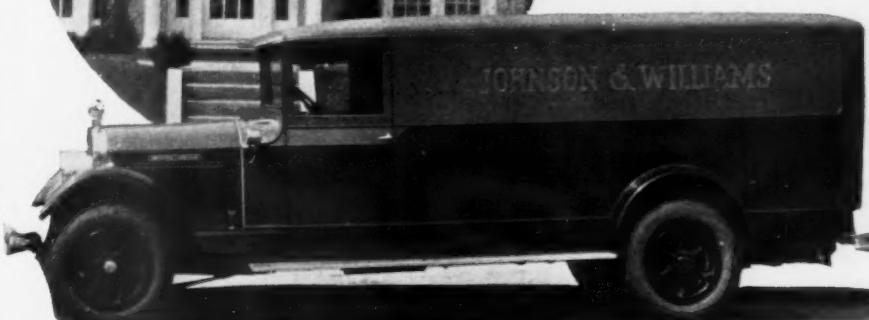
So far we have talked only about a delivery department using a belt conveyor. If a table is used the only difference is that the packages are not handled by a router. Instead they go straight to the middle of the sorting table, which may be of any size, depending on the volume of packages handled. There may be one or more men stationed at the point the packages reach the table and their function is to read the address labels, recognize the section of the city and then shove the package along the table in the direction of the proper sheet-writing or stubbing bin. Packages can be slid 30 to 40 ft. along a smooth table without hurting them. The table has side boards 3 to 4 in. high to keep the packages from falling off when they hit the edges. The former belt boys become table boys. They are located around the edge of the table and they in turn pick up the packages being shoved in their direction to identify the address with the proper bin. From this point on internal delivery is carried on the same as with the belt.

With the packages in the drivers' bins, internal delivery is complete and external delivery commences. When one delivery daily is provided, the internal delivery function is completed the day the merchandise is sold. The following morning the driver reports to the delivery superintendent and then goes to his bin for his load. Usually he counts every package and checks it against the record made by the sheet-writer or stubber. Special attention is given to C.O.D. packages to see that none are missing, as the driver must return either the money or the package. While the checking operation is in progress, the packages are likewise being sorted by territories or streets, whichever way the driver works. The first division is called a "rough sort." It consists of splitting a route or territory into any number of smaller units which usually range from 6 to 12. If there are 200 packages in the load, there will be from 15 to 40 packages in each "rough sort."

Where the driver delivers from the front of the truck, which is often the case, he will take his first rough sort to be delivered and place it on the seat. The



Below, an attractive panel job on the Fleet Arrow chassis





Belt boys transferring packages from belt conveyor to sheetwriters' bins

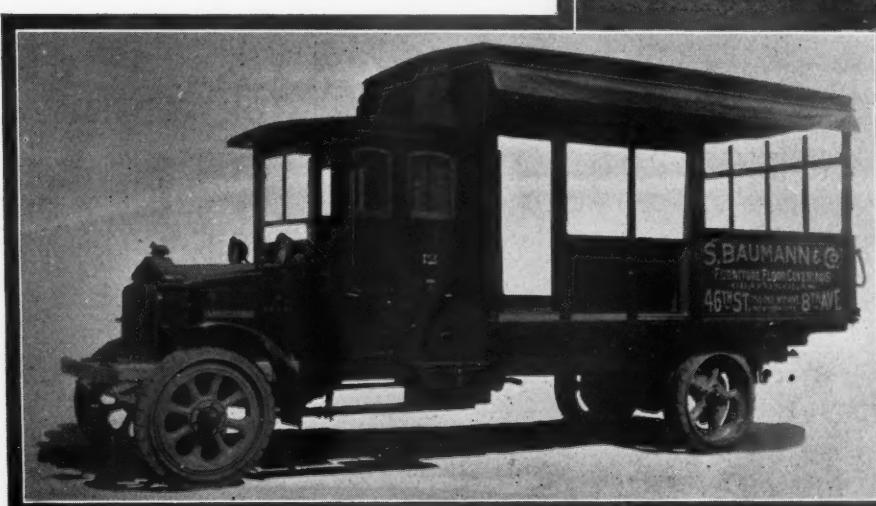
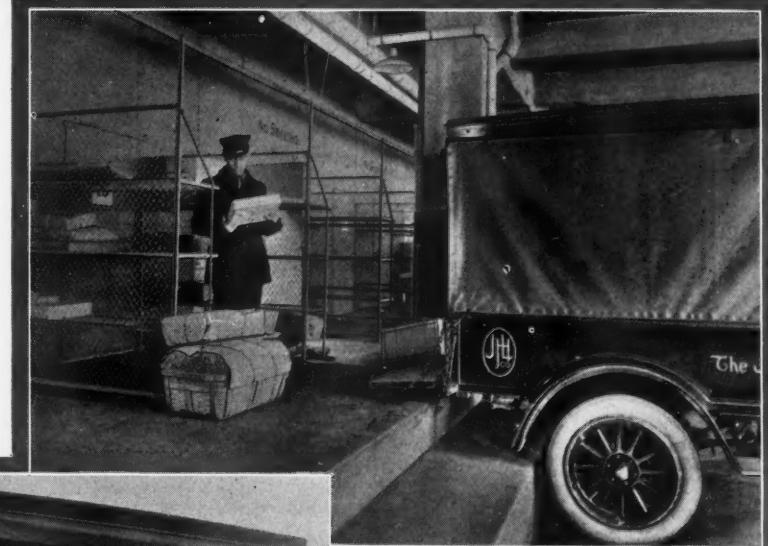
second rough sort to be delivered will be placed directly behind the driver's seat and so on with each succeeding rough sort until the rear of the body has been reached. Of course, where the truck is loaded from the front, as is sometimes done, this procedure is reversed. There are various ways of separating each sort to keep them from becoming mixed, which need only be mentioned but not discussed in such a limited article.

After the truck has been loaded in this manner, the first part of the load which was placed on the driver's seat is "fine sorted" which means each package is arranged in the exact order in which it will be delivered. The driver next reports to what is called the "will call" room to find out if he is to stop at any house along his route to bring back merchandise which customers wish to return. The driver is now ready to leave the delivery room.

After he has delivered his first rough sort

he must stop for a few minutes to fine sort the second group of rough sorted packages. He then delivers these packages and stops to fine sort the third rough sort and so on until the load is delivered.

When you consider that an average day's work means delivery of 150 to 300 packages per truck, you realize that the simple matter of loading is not as simple as it first seemed to be. In fact some drivers prefer to fine sort the entire load before leaving the garage. Some stores have special loaders who load the truck at night, so that the driver



The Jordan Marsh electric, above, has a Roloff demountable furniture body. Directly below are shown bins provided for driver in rough-sorting his load. At the left is a side-loading furniture truck

can start on his route after signing for his load in the morning.

Much depends upon the type of route to be covered; i. e., how far the driver must travel before starting to deliver, how many C.O.D.

packages are on the load, how much of the route consists of apartment houses, how many single dwellings there are. Highways and traffic conditions make a difference also as do other factors, such as the number of deliveries made per mile and the relation between the number of stops and the number of packages delivered. One driver may deliver 500 packages and not do as much work as another who delivers 300 parcels. Five hundred package load might have been delivered at only 150 houses or stops while the 300 parcel load may have represented 200 stops.

The load may consist of packages alone or packages and bulk goods. If the store handles a sufficient amount of bulk merchandise it may operate separate bulk trucks or it may deliver the bulk merchandise on the furniture trucks if it sells furniture. If the bulk is small in amount it will probably be put on the package trucks. There is no standard way of handling this problem, for stores are not standard. It is better to handle the problem in the most economical manner than to standardize its solution.

From this explanation you can tell that the loading problem is more or less complicated because of the miscellaneous kind and sizes of goods to be handled. The thing for the truck salesman to remember is that a store handling a lot of bulk merchandise on package truck needs a considerably larger body and longer chassis than the store which delivers packages alone. The salesman must also know that the variations in the store's business and consequently in the number of packages per day is as much as 500 per cent and 300 per cent is a common figure. This means that if the truck body has extra carrying capacity these additional loads can be taken care of partly by adding an extra helper or two to the crew and giving them say 700 to 1000 packages to deliver instead of half the number.

If it is impossible to put such a load in the body the only recourse the delivery superintendent has is to hire extra vehicles or work his crews unmentionable hours. Good drivers are scarce but helpers can be picked up who are fairly satisfactory when put on a vehicle with a good driver.

Motor truck men have studied the loading and unloading problems of the dump truck field, of the bottle industry, of the brick industry and such places where it meant the design of special equipment, but not so much thought has been given to the department store loading and unloading problem which is more a matter

of body sizes, seat arrangements, size of door openings, getting the body lower to the ground, and the developing of personnel handling methods.

While the foregoing is only the sketchiest kind of an outline of some of the problems of department store delivery, space will not permit going into greater detail. It is hoped that truck dealers and salesmen will find the information presented of value to them in their sales work and that salesmen who are not familiar with the intricacies of department store delivery will be able to use it as a basis for a more detailed study of the problems of this class of truck buyers.

Service Records Saved This Customer

"Why should I buy another one of your trucks?" was the irate reply of a fleet operator when solicited for a replacement order. "I just looked over my cost records and find your truck cost me \$115 for repairs last year and it's only a year and a half old. You know as well as I that that is too high and besides my other trucks of the same age average about \$60 to \$75."

The salesman who received this greeting asked to see the records. Explaining that he wished to compare notes with his service station records, where the truck is serviced, he departed, assuring the operator at the same time that something was wrong somewhere.

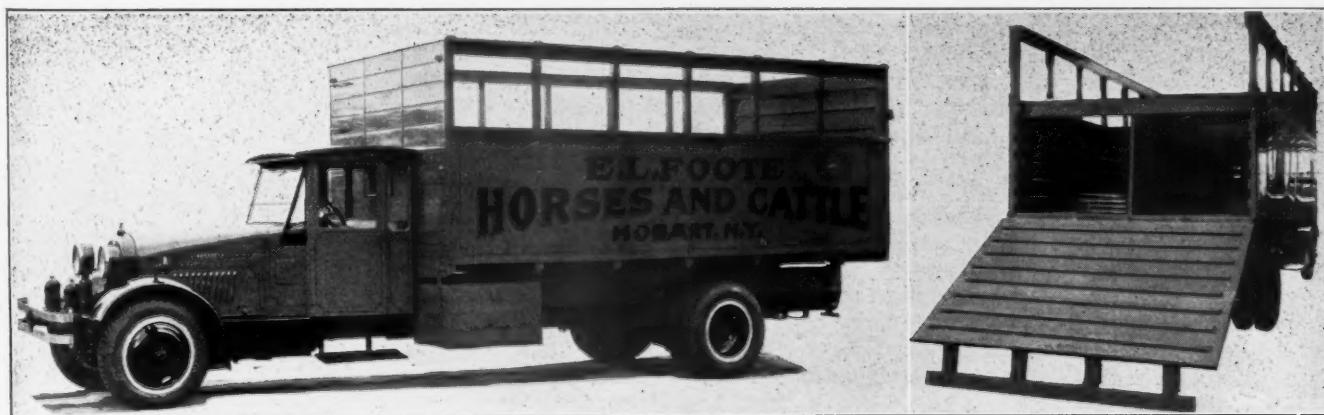
Returning next day with an analysis of all repairs rendered on the truck in question for the past year, the representative was equipped with evidence proving that the fault was not with the truck. He said:

"Mr. Brown, your records do not show why repairs were required on your truck, otherwise you would not have complained about the cost. Our records show that this particular truck was in two accidents during that period which cost you \$65. Deducting that from \$115 you have a charge of \$50, which is the figure that should be used to make a just comparison."

Mr. Brown promptly recalled the accidents and was satisfied.

John J. Raskob, chairman of the finance committee of the General Motors Corp., was appointed chairman of the Democratic National Committee, at a recent organization meeting of that committee. He is a close friend of Al Smith, the presidential nominee.

Mr. Raskob has been associated with the E. I. du Pont de Nemours Co. since 1900, as secretary, treasurer, and vice-president. He was elected chairman of the Finance Committee of General Motors in 1917.



Equipment used by the Hobart Sales & Exchange Stables, Hobart, N. Y., for making deliveries. E. L. Foote of the stables, handles about 800 horses and 2500 head of cattle annually. The van is a model FH-32 Larrabee and can accommodate four horses or 10 or 12 cattle at a time

The Editor's Notebook

About Used Truck Accounting While theoretically perhaps the allowance on a used truck should be what it can be sold for less reconditioning and handling expense, it is difficult to carry this theory out in practice as the losses being sustained by the dealers and branches on trade-ins testify. It is important, however, for the trade to distinguish between the allowance on a used truck and its market value if the books of the business are to mirror accurately conditions as they are.

A branch manager in a large eastern city meets this condition by having the manager of his used truck department handle all appraisals and by making him responsible for selling used trucks at the appraisals he places upon them. If in a particular instance the branch manager finds it necessary or desirable to allow more than the appraisal, he does so with full knowledge of what he is doing. Moreover, if he does allow more than the appraisal, the used truck nevertheless is charged into inventory at the appraisal figure.

Used Truck Inventory Shows Real Values

at the time the expense is incurred and, moreover, it is not saddled on the used truck department but is charged to new vehicle sales where it belongs. Another advantage of the plan is, of course, that used truck inventory does not show inflated value and, in addition, the profit and loss statement does not indicate earnings that will never be realized because they are based on fictitious used truck values.

The idea of centralizing the appraisal function in the manager of the used truck department is not a new one, but the practice of distinguishing between the appraisal and the allowance actually made, as is done in this case, is not so general. Making this distinction relieves the manager of the used truck department of all pressure from the salesforce and at the same time places the responsibility for allowances on the branch manager who thus is kept in continuous touch with this important phase of the business.

In other words, the over-allowance on the used truck is absorbed

Logically, of course, there is no justification for used truck over-allowances but as long as the trade finds it expedient to make them, it is important for dealers to keep their books so that they will show just what is taking place. The plan described in the foregoing does this.

Space Limits Used Truck Stock

We have heard of all sorts of schemes for putting a safety valve on the used truck inventory, but this same branch manager whose accounting methods have been discussed sprang a new one on us. He assigns a definite amount of floor space in the branch building to the used truck department, and it is up to the manager of that department to keep his stock small enough to get it into the allotted space.

Incidentally this plan ties in with that of making the manager of the used truck department responsible for selling trade-ins at the appraisal he placed on them, as mentioned in the preceding item. He must keep the stock moving rapidly if he is to store it in the allotted space, and, to do this and at the same time get the appraisal price for the trucks, his original valuations must be pretty near correct.

The Market for Beauty

Panel body jobs combining beauty of line and color to a far greater extent than in any previous designs, have been introduced recently by a number of makers and have met with a very favorable reception. They are, of course, best adapted to the use of the class of retailers who surround their operation with a halo of exclusiveness. But this is not the only field for this type of body, as in a number of cities retailers catering to the public as a whole have added one or more of these de luxe jobs to their fleets. In such cases, the plan is to use the de luxe models for deliveries to exclusive residential sections and, in some instances, for the delivery of specials. This plan very materially broadens the immediate market for the de luxe type of body.

Buses Will Replace Trolleys

*Frank Fageol Tells Second
Annual Convention of the
Bus Division of the A. A. A.*

DURING the past year and a half several of the leading coach manufacturers have developed and are developing motor coaches incorporating all of the efficiency for carrying capacity which has developed in the rail car during the past thirty years. In other words, a modern motor coach of the Twin Coach type is really an ultra-modern street car freed of the limitations of steel wheels and operating on pneumatic rubber tires, without loss of mass transportation carrying advantages, but with all of the maneuverability of the automobile gained—a unit in which the automotive industry has adapted and coordinated the advantages developed in the street car and steam railroad industry with the advantages gained in the automobile industry.

In view of this fact, the claim can no longer be sustained that fixed rail cars are more efficient in handling mass transportation than the modern motor coach, and since this is such a recent development and so very few people are really familiar with its significance, it is only natural that the general trend of thought is on the assumption that rail type transportation units are the only practical means of handling mass transportation. I am firmly convinced that fixed rail urban and suburban surface transportation will ultimately disappear from our streets; however I believe it will take twenty years to make any appreciable change, and the aim and effort of all people truly interested in the economics of the situation should

be to work in harmony and develop ways and means for gradual substitution of motor buses for rail cars to the end that the great public investment in rail systems shall be conserved and, insofar as possible, returned to the investors.

In order to reconcile your views to the foregoing statements, I suggest that you stop and take into consideration the following facts: Twenty years ago there were substantially as many miles of fixed urban track and as many electric street car units operating

as there are today but very few automobiles in general use. Today, in addition to the street cars, there are approximately 25,000,000 automotive vehicles operating on our streets. Naturally, this condition has created an entirely different traffic and transportation problem from that with which the public was confronted fifteen or twenty years ago.

All people seem to be victims of custom and habit. If you will drive your automobile around the city street for a day you will probably find you have been delayed anywhere from five to ten minutes behind a street car, and while you may not particularly like this, you do not build up in your mind any great resentment over the fact, simply because the street car and fixed rail system was a fixture on the street before your automobile came and you unconsciously make allowance for it. On the other hand, if you are driving in the country and are delayed as much as a half minute or a minute behind a motor bus or truck you are apt to fume over the delay and think many unkind things about both the manufacturer and the operator of such a vehicle. This mental attitude is probably produced because the automobile was a fixture here prior to the motor truck and motor bus. Carrying this line of thought a little further, try to visualize what would happen if all automobiles and all vehicles on a street had to pursue a perfectly straight line as does the fixed rail unit. I believe it will be agreed that our streets today would not be able to take care of any more than a small portion of the traffic. It



Frank R. Fageol, president of the Twin Coach Co.

In the evolution of our transportation system, Frank Fageol sees the bus playing an increasingly important part. Eventually, in his opinion, it will displace the electric street car in urban and suburban service and on inter-city runs up to two or three hundred miles it will offer the steam railroads serious competition. Mr. Fageol is not only one of our most resourceful designers of bus equipment but he is also recognized as a keen student of transportation. You'll find his views very interesting.

would mean that the delay of each vehicle would be multiplied by every vehicle in line with the particular cause of the delay. It is by a contrast of this kind that we come to a real appreciation of the mobility and flexibility of the automotive vehicle. While some people may claim that a straight line is the shortest distance between two points, surely no one can claim that it is the quickest distance between two points when progress between said two points is barred by obstructions which cannot be negotiated.

In the final analysis, the economics of the situation must prevail and the economics of transportation are necessarily made up of the following dominant factors:

1. Convenience to all the people, including those using public transportation units and those using private transportation units.
2. The time element.
3. The cost.

Our experience teaches us that the actual direct cost per mile of operating a modern bus of large seating capacity is about the same as the direct cost of operating an electric rail street car. But since there is a difference in the total investment per transportation unit between the modern bus and the street car of about 1 to 2½ (a modern bus unit with all garage and service equipment costs about \$14,000 as against about \$35,000 for a street car unit including tracks, overhead, etc.), there is necessarily a difference in interest charges and amortization anywhere from four to seven cents per mile in favor of the motor bus in operating costs. Therefore, if our present large transportation companies will, if and when a considerable portion of any piece of track needs replacing or repaving, replace that entire line with modern motor buses, using the good cars removed therefrom on other remaining trunk lines of the system and then use this saving of four to seven cents per mile as a sinking fund, we feel that practically the entire street railway investment can be amortized and returned to the owners in a period of fifteen to twenty years.

Regarding interurban bus service, it is again apparent that the modern large carrying capacity motor coach is going to play a very large part as a practical substitute for the majority of fixed rail local transportation lines between cities, perhaps even up to and including distances of two to three hundred miles.

The foregoing statement is based on the fact that up to the present time bus fares and railroad fares have been substantially the same rate per mile. This was because the operating costs of smaller buses made it necessary to charge 3 to 3½ cents per mile. Today with larger and more modern buses which can be operated at practically the same cost, it is possible to profitably operate a bus line when there is a fair density of traffic at an average fare of 2 cents per bus mile. Eventually, if the present situation is any criterion, most local interurban bus fares are going to settle down around this figure.

Ready Adaptability

In addition to the economical advantage to the passenger, one other great contributing factor in the popularity of the bus lies in the fact that it is free to tap any and all parts of communities most convenient to the public and can readily adapt itself to changing centers of population, without the tremendous investment necessary to rail extension and changed rail routes. Added to all this, of course, is the feeling of most people that there is a more pleasant sensation and more comfort when riding in a free-moving highway vehicle than there is when riding on fixed rigid rails.

We do not believe that, even though the bus finally accomplishes everything in transportation that is contemplated in these remarks, it will eventually work out to the detriment of fixed rail systems, for the urban systems can be gradually adapted to do what might be termed the jobbing or long distance transportation of both freight and passengers. If this country were today to spend several billion dollars in

improving the highways and then put motor buses and motor trucks on every one of them, it would be the greatest possible boon to the steam railroads, because to them it would be the equivalent of building branch lines into every section of the country as feeders for their main and trunk lines without the investment or the loss attendant upon operation.

Another point to be taken into consideration, and I believe generally misunderstood, is the often raised question and theory that the states and counties build the highways and right-of-ways over which motor buses operate without paying anything for the operating privilege. To those who think along this line I try at every opportunity to point out that it is most erroneous. The facts are that the motor bus is merely fortunate in being able to take advantage of and use a highway which had to be built for the convenience of the general public and in the use of which the motor bus probably in no instance represents more than three to five per cent of the total travel thereon. In other words, the cost of building and maintaining the highways can be and is properly divided among everyone who can use them, whereas in the case of the railroad, since this right of way and roadbed is for private use, its construction and upkeep should be chargeable to the railroad alone.

Convincing Evidence

Recently in the State of Kansas, the Interstate Bus Company, operating between Kansas City and Topeka, was threatened by the Legislature with increased taxes, notwithstanding the fact that it was already paying a very fair tax. In arguing against the threatened increase, H. H. Moore, president of the company, discovered and presented some very interesting facts, viz., that his buses by actual traffic count represented only 3 per cent of the traffic on the 76 miles of highway, whereas the taxes they were paying were sufficient to pay for 78 per cent of the total maintenance cost of the seventy-six miles. The figures used in his argument were furnished by the United States Highway Department and confirmed by the Highway Department of the State of Kansas, and it is needless to say that upon presentation of the figures, the very people who were advocating increased taxes through misinformation were very frank to state that the taxes were really too high, and they dropped the case.

The figures compiled by your organization prove that all buses, almost without exception, are paying more their fair share of the highway cost. Unfair, restrictive and exorbitant taxation levied against the bus cannot help but be reflected in increased cost to the consumer of highway transportation. The public is beginning to realize this and is reluctant to be a party to any movement calling for a rate of bus taxation disproportionate to the use of the vehicle makes of the highway.



Ford trucks accompany combined harvester and threshing machines on a 26,000-acre farm in California to receive the grain as it is discharged

C. C. J. Shop Hints

Your idea in print will
return five dollars



Unit Storage

Unit assemblies are made quickly accessible in the shop of the Williams Bakery Co., Scranton, Pa., by the use of a table equipped with shop-made brackets. The table illustrated, which was designed by Jim Newell, garage superintendent, provides room for radiator, transmission, differential, front axle and engine assemblies. The engine, not shown in the photograph, having been removed just before the picture was taken, is placed crosswise on the forward end of the table. The standardized fleet of Williams Bakery Company has made this plan very practical by cutting idle shop time to a minimum. Assemblies removed from a chassis are overhauled immediately to replace the one removed from the table.

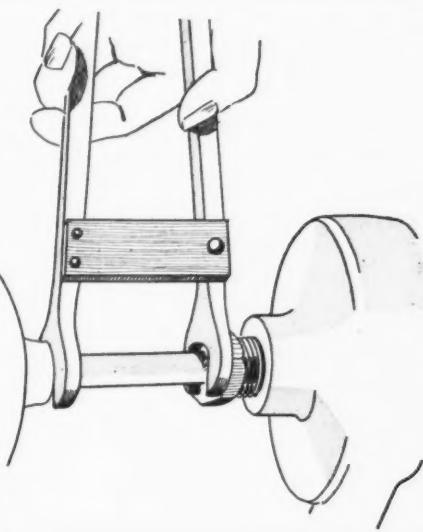
Adjustable Focusing Screen

The usual target employed for aligning and focusing headlights can be improved by making the horizontal line adjustable in height to correspond with the height of lamps.

A simple pulley and rope arrangement accomplish this purpose for Scranton Water & Gas Co., Scranton, Pa. A rectangular frame is provided in which the white target with black horizontal and vertical lines can be raised or lowered. The frame is self-supporting and can be moved about the shop at will without changing the position of the target.

A variation of the same idea is used with success by Smith & Clark Co., Wilkes-Barre, Pa. In this case a movable cross-bar is employed to serve as the horizontal line which can be moved up and down within a range of four feet. The ends of the horizontal bar are drilled to receive vertical bars mounted on the side members of the frame. The vertical bars are exactly parallel and so spaced as to slightly cramp the horizontal bar. This cramp-

ing action results in sufficient friction to hold the horizontal bar in any desired position. At the same time this tension is not so great as to prevent easy up and down adjustment. The vertical bar at the right is graduated in inches done by notching and filling with white enamel. This enables the tester to accurately place the bar at any desired height in the same manner as the bar and standards are used in pole vaulting. This company uses the target in connection with white lines marked off on the garage floor. Space, however, is not wasted because the target when not in use is pulled up to the ceiling and out of the way by means of a rope and pulley.

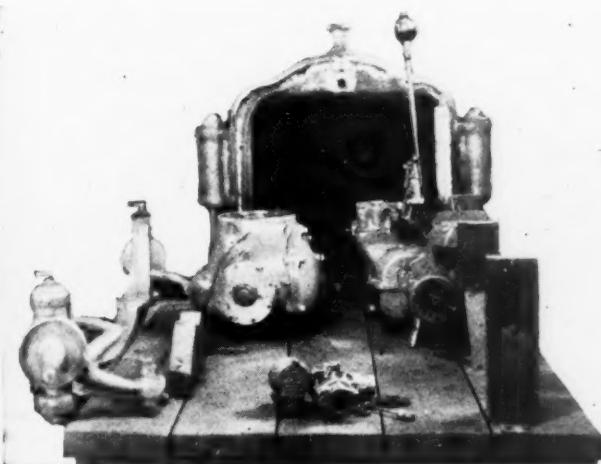


Special tool for starting water pump packing nuts

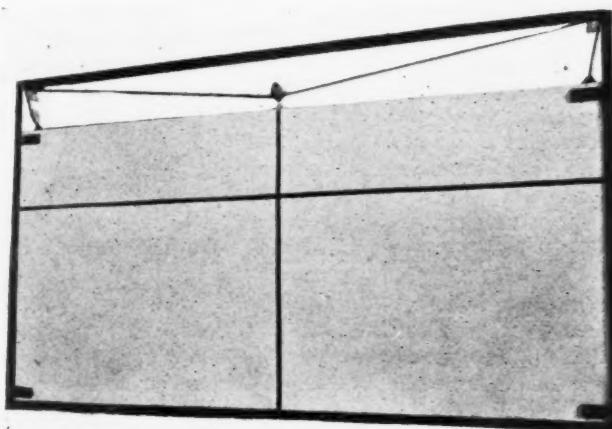
Pump Packing Nut Tool

The difficulty of starting the packing nut of an engine water pump on the threads after new packing is inserted or when the threads are bad has been overcome in the garage of the Scranton Water & Gas Co., Scranton, Pa., by use of a special tool.

It consists of two forked members, one of which is pivoted to two links joining the forks, the other being riveted to the links. The riveted member is placed against the coupling on the pump shaft and the pivoted fork placed in contact with the packing nut. Pressure exerted on the handles forces the nut in contact with the threads and it is tightened with a wrench.



A table makes unit assemblies quickly accessible



Pulley adjustable headlight focusing target

LEAKAGE of liquids and gases from various units of a motor vehicle represents a loss or an annoyance to the owner. Some of these leaks are easy to stop, others are quite difficult. In either case there is an opportunity to add to the income of the service department by selling leak-stopping operations alone or in connection with other work to truck and bus owners.

Considering the conditions under which trucks and buses operate it is not surprising that leaks develop. They carry engine oil, gasoline, water, heavy oil, grease, battery electrolyte and anti-freeze solutions in what are practically closed containers and conduct air under less than atmospheric pressure and exhaust gas under comparatively high pressure through pipes. In addition there are many valves, connections and joints which may leak, and packing and stuffing boxes of many types which must be kept tight. Some of the parts in which we wish to retain lubricants are moving rapidly, as in the case of universal joints while others have no motion, but it is equally important to prevent leaks. Crankcase oil-pans are an example of the latter group.

Owners and their employees undertake to put a stop to a few of the more apparent leaks and losses. A driver will see to it that dripping of gasoline from the carburetor is stopped and he will make some complaint about water leaks if he is obliged to stop and fill up the radiator on the road a few times. But leaks of oil from engine oil-pans, lubricant from transmissions and slow seepage of gasoline from fuel lines are likely to continue for some time.

Because of these conditions an alert service salesman has a good opportunity to sell many operations in addition to the more usual items. Little effort is required to convince an owner that money will be saved by stopping an oil or grease leak. It is not difficult to show that time and money will be saved by having new radiator hose installed, while other work is being performed.

Most of the inspection required to locate leaks is made by the service salesman or service manager as a preliminary to writing up a repair order. In fact, leaks are valuable aids in locating and distinguishing conditions which call for repair. But little change in procedure is required, therefore, in searching out leaks about the chassis with the idea of selling the owner on the advantage of having them stopped.

Leakage of rear axle lubricant onto brake drums is one of a class in which the effect on operation is more important than loss of lubricant. In the mind of the owner rear axle-brake leakage represents a tie-up of a vehicle and no salesmanship at all is required to convince him that the leak should be stopped. On the other hand a slight leak of lubricant from the transmission case may seem relatively unimportant to him, especially if the cost of stopping the leak is large.

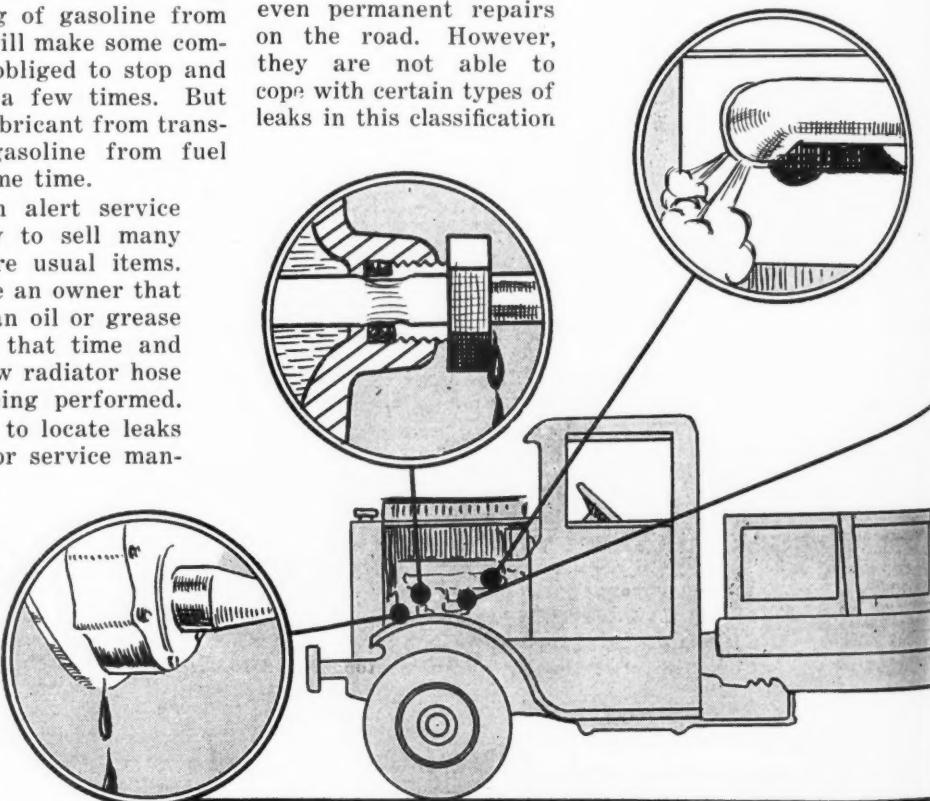
Prevention of leaks can be overdone and in this case the goodwill of the customer is reduced. No set rule can be followed in offering to perform operations designed to stop leaks. The type and age of the truck, service in which it is used, general mechanical condition, local rules about depositing oil on paved streets,

Leaks

Shops May Profit by That Owners Can

and the owner's need of the vehicle in question at the time are factors bearing on the case. An owner who might at one time welcome a suggestion that a set of exhaust manifold gaskets be installed, might decline at another time to keep a truck out of service long enough to have a new felt installed in a front wheel. It may be helpful to consider the situation as the owner sees it and make recommendations accordingly.

Water, gasoline and engine oil leaks perhaps are most likely to be noticed by drivers. In many cases they make temporary or even permanent repairs on the road. However, they are not able to cope with certain types of leaks in this classification.



Leaks at various parts of a chassis may be of a minor nature which can be stopped by more extensive repairs are required. In the latter class are leaks caused by exhaust manifold, stripped threads on carburetor connection and

and they therefore look to service stations for assistance. There is no particular trick to the job of installing a new radiator hose on most motor vehicles and tightening a pump packing nut presents no unusual difficulties. But installation of a new pump shaft is another matter. It may be necessary to remove other parts of, or about, the engine.

Likewise, a driver can tighten a gasoline pipe union with ease but if the thread strips or a leak develops because of faulty action of a carburetor float mechanism he may not be able to effect a repair.

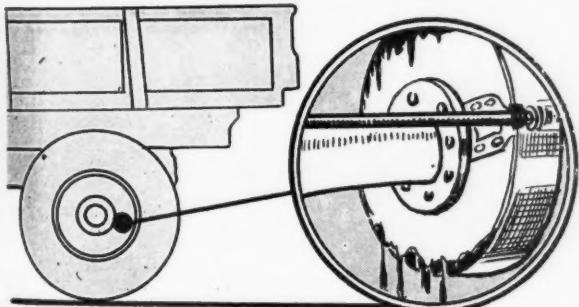
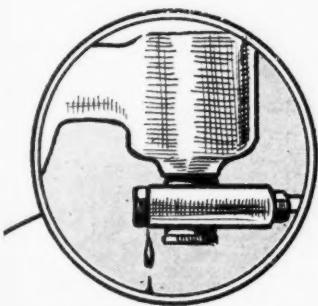
are Losses

Selling Leak-Stopping Operations Not Readily Perform

Engine oil leaks, like water and gasoline leaks, may be due to looseness of bolts or they may be due to some condition more serious. Many service men prefer to install all new gaskets whenever an engine oil pan is removed. If this practice is not followed there is a possibility of a slight leak developing at the joint between pan and crankcase or between pan and point of attachment to front main bearing cap or timing gear compartment. Due to the fact that a gasket may "set" after it is applied it may be necessary to retighten the bolts holding it in place some time later in order to prevent a leak.

Escape of oil from the rear main bearing area of the crankcase and oil pan may be due to a misplaced felt or to a condition which cannot be cured without extensive repairs. Oil leakage at this point has puzzled

more than one truck owner and service manager. It may be caused by an obstructed crankcase breather, by worn bearings, excessive blow-by in cylinders, clogged oil return passages in the oil pan and other like conditions. Continued leakage is a serious matter because extensive damage may result if



stopped by tightening or they may be such that timing case gaskets, worn pump shaft, warped defects in rear axle grease retainers

the oil supply is depleted and in extreme cases the loss of oil may be several quarts in an hour or two. Cure of conditions such as these are without the scope of the supplementary operations under discussion in this article. Direct leakage from a missing or displaced packing at the rear main bearing may properly be included in the classification.

Another point about the engine at which leakage may be found is the gasket or gaskets on the valve spring compartment cover. In some engines there is little but crankcase vapor in this compartment, but in others

By James
W. Cottrell

there is quite a quantity of oil at all times and this will drip down over the side of the engine unless the gasket is in good condition and the bolts are tight.

In engines with blocks detachable from the crankcase any leakage from the joint between the parts may be taken as an indication that the bolts holding the cylinder block are loose. Irrespective of any loss of oil it is important that the bolts be kept tight at all times.

Dripping of oil from the front of an engine when it is parked for several hours at night may be due to a leak in the cover over the timing gear or chain compartment. In some engines there is a pocket at the bottom of this space in which oil is allowed to accumulate to insure the lubrication of the gears when the engine is started. All of this oil may escape through the joint at the cover. A leak at this point may be stopped in most cases by tightening the bolts holding the cover, but in some instances a new gasket will be required and this operation may involve the removal of the radiator.

Greater attention is being given the matter of fumes in the space under the hood because of the increasing use of enclosed cabs. An exhaust leak that would seem trivial to a driver out in the open may be quite offensive to a driver in a cab which is just as fully enclosed as a passenger car coupe. Therefore the operation of installing new exhaust manifold gaskets is being performed somewhat more frequently than was the case a few years ago. If a combination intake and exhaust manifold is employed both intake and exhaust gaskets will be replaced at the same time.

Leakage of air into the intake manifold either at the carburetor or engine block openings affects engine performance and the ease of starting. Use of vacuum tanks and of vacuum brakes has shown that something more than a pin hole in the manifold is required to interfere with the operation of an engine, but nevertheless intake manifold leaks are undesirable.

Although most of the leak-preventing jobs can be performed with hand tools ordinarily found in mechanics' kits, a few special tools have been developed for certain difficult operations. Water pump packing nut wrenches with short handles and handles at unusual angles, combination socket wrenches for work about manifolds, wrenches for gasoline line unions, speed wrenches for oil pan bolts and heavy-duty screw drivers for tightening hose clamps may be mentioned in this category.

The Instruction Book—a Sales Asset

Personal delivery of the instruction book is made during a call for that purpose shortly after delivery of a motor vehicle by a successful dealer. The plan has brought large dividends in reduced complaints, better owner good-will, and lessened cost of operation.

Both old and new owners are benefitted by the personal book delivery. Old owners, thinking they are familiar with the construction of the vehicle may pay no attention to the instruction book and later on find out that some change in construction has brought about

(Turn to page 32, please)

Commercial Car Journal

Flat Rate Price List Number 19

Six-cylinder Engine Graham Brothers 2-ton Truck

Bore 3 1/4 in., stroke 4 1/2 in.

Radiator

1. Assembly, remove and replace	\$ 1.30
2. Core and tank unit, renew	2.25
3. Shell, renew	2.25

Hose

5. Renew top hose	\$ 0.40
6. Renew lower hose	.50
7. Renew pump to pipe hose	.40

Fan

8. Renew fan belt	\$ 0.60
9. Shaft bearings, renew	2.50
10. Fan assembly, remove and replace	1.80

Water Pump

11. Water pump, remove and replace	\$ 2.25
12. Water pump assembly, overhaul	3.25
13. Renew packing	1.75

Manifolds

1. Renew carburetor gasket	\$ 0.40
3. Renew manifold gaskets	1.50
4. Manifold to exhaust pipe gasket, renew	.50

Fuel System

6. Carburetor, remove and replace (Stewart)	\$ 0.80
6b. Carburetor, remove and replace (Stromberg)	1.35
7. Carburetor, remove and reinstall, disassemble and clean	2.00
8. Carburetor choke wire, renew	.55
10. Clean gas tank and lines by blowing out with air	.75

Muffler

12. Muffler, remove and reinstall or renew	\$ 1.35
14. Tighten muffler, tail pipe and exhaust pipe	.60

Miscellaneous

3. Renew cylinder block, includes fitting and aligning all bearings	\$ 57.50
5. Inspect internal condition of engine, including removal of cylinder head, oil pan, and connecting rod assemblies. Measure cylinder bores, pistons and crank pins and reassemble	6.75
7. Tune engine. Clean and adjust breaker points and spark plugs, clean fuel supply and carburetor screens, retime ignition, adjust carburetor and fan belt	4.00

8. Tighten all engine support bolts

9. Clean engine	2.00
10. Check compression, ignition system and fuel system to locate engine miss	2.00

14. Hone or bore all cylinders, install all oversize piston pin and ring assemblies (includes aligning rods)	33.30
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Rod Bearings

1. Remove and replace connecting rod assemblies	\$ 7.50
2. Align all rods after they have been removed	1.25
5. Renew one rod bearing	3.50
5a. Renew each additional rod bearing	1.50

Oil Pump

17. Repair oil pump	\$ 3.50
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Lubrication

19. Clean oil lines after pan is removed	\$ 1.40
20. Make oil test on bearings after pan has been removed	2.00
21. Adjust oil pressure regulator	.40

Pins and Rings

2. Renew rings when rod assemblies are out	\$ 3.60
3. Renew all rings and align rods	12.35
4. Standard size pins and bushings, renew all and align rods	13.85
5. Oversize pins, install all and align rods	12.35
6. Rings and oversize pins, install all and align rods	15.95
7. Oversize pin, install one after rod is out	.80
9. Oversize pins, install all after rods are out	3.60

Piston Assemblies

11. Oversize piston, pin and ring assembly, install one by selection after rod has been removed	\$ 3.60
12. Hone or bore one cylinder, install one oversize piston, pin and ring assembly, after rod is out and head is off	5.95
13. Hone or bore all cylinders, and install oversize pistons, pin and ring assemblies after rods are out and head is off	26.45

Note.—Interchangeable non-adjustable connecting rod and main bearings are used in this engine. Replacing a connecting rod bearing involves an exchange of connecting rod. New main bearings may be installed without removing the engine from the chassis.

Prices given are for labor only for the operations listed.

Main and Rod Bearings

4. Main and road bearings, renew all and align rods	\$36.50
6. Main bearings only renew without removing engine	25.00

Crankshaft

8. Renew crankshaft and main connecting rod bearings (includes aligning rods)	\$36.50
9. Adjust crankshaft end play	6.75

Valves, Tappets

1. Grind valves, clean carbon and tune engine. Reface valves and seats, clean and adjust breaker points and spark plugs, clean fuel supply and carburetor screens, adjust valve tappets and fan belt and retime ignition	\$13.50
2. Grind and reface valves and seats, clean carbon and adjust tappets only	9.25
3. Valve stem guides, renew in connection with operation 1	3.50
5. Ream guides oversize and install all oversize valves in connection with operation 1	1.50
6. Adjust valve tappets	1.40
7. Valve spring, renew 1	3.50

Timing Chain

1. Timing case cover, remove, clean and replace (includes removing and replacing radiator)	\$ 4.25
2. Adjust timing chain	.50
4. Renew chain	5.25

Camshaft

7. Camshaft, remove and replace or renew after timing case cover has been removed	\$11.50
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New Trucks of the Month

Coleman

A NEW six-wheel drive model has been developed by the Coleman Motors Corp., Washington, D. C., for handling very heavy loads off of the regular highways. The engine, which is mounted forward of the front axle, is a 4½ in. x 6 in., six-cylinder Buda Model GL. A starter, generator and battery ignition are fitted.

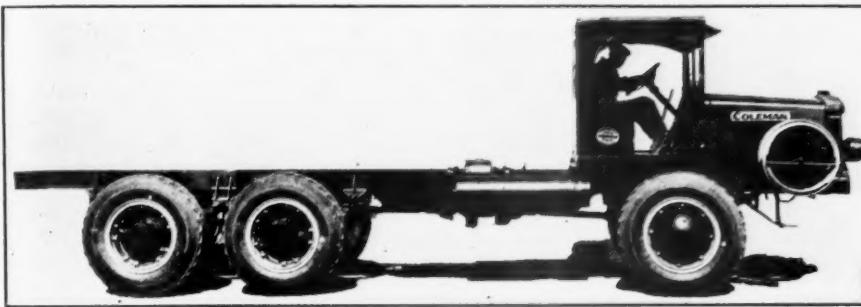
The two tandem mounted rear-axles are worm drive Wisconsin with double-ended worms. Each axle is attached to the frame by two semi-elliptic springs, which are pivoted to a bracket located

axles. This fact combined with locking differentials in all the axles is stated to assure positive drive at all times.

A Westinghouse air compressor driven from the timing gears is used in connection with service brakes which act on the four rear wheels. The hand brake is mounted in the center of the drive system upon the auxiliary transmission.

The wheelbase is 144 in. between the front and front rear axle and 53 in. between the two rear axles. The frame provides 216 in. of loading space behind the cab.

While the truck is furnished with 42 x 9 in. single pneumatic tires upon all



New 7½-ton, six-wheel drive Coleman. The rear axles are worm drive Wisconsin mounted in tandem and the front is a double-reduction Wisconsin. Drive is taken through the springs

on the frame between the two axles and shackled to brackets at the opposite ends. There being no torque members or radius rods drive is taken through these springs. In addition to the semi-elliptic springs, a load is taken through two pairs of helical springs mounted above each axle and to either side of the worm-shaft housing. Power is transmitted from the forward axle to the rear axle through a short propellor shaft equipped with two universal joints. Differentials, all parts except the worms and worm shafts and all axle shafts are interchangeable front and rear. The front axle is a Wisconsin double reduction axle to which the Coleman type front wheel mechanism is fitted.

In combination with a four-speed Fuller HU-16 transmission is the Coleman auxiliary transmission providing an additional two-speed shift with ratios of 1-1 in high and 3.48-1 in low. This combination gives the vehicle eight speeds forward and two reverse ranging from 8-1 high to 176-1 low. Driveshafts are Spicer and under loaded conditions run with practically no angularity.

Following the practice used in the Coleman four-wheel drive trucks no differential is fitted in the auxiliary transmission between the front and rear

wheels, 42 x 9 in. dual pneumatics can be supplied on all rear wheels when necessary. A power tire pump is provided upon the transmission as regular equipment.

Steering is by Ross cam and lever type gear. Two cylindrical gasoline tanks, one on each side of the frame, carry 22 gallons each. Feed to carburetor is by a special two-gallon Stewart vacuum tank mounted on the dash.

The steel frame cab is Vehisote paneled and mounted upon its own sub-frame which in turn is mounted upon a three-point suspension on the main frame. Cabs are available either open or closed type in three different widths.

Indiana

INDIANA RANGER Model 200 is the name of a new one-ton truck recently added to the line of the Indiana Truck Corp. This new unit has a wheelbase of 137 in. and is equipped with a six-cylinder engine and four-wheel brakes. Tors-Elim 3-point mounting of cab, engine and radiator units, which construction is characteristic of Indiana trucks, is used also on this model. This mounting provides a support for the radiator, hood, cowl and cab and is designed to free these units from torsional strain and vibration to which the chassis is subjected.

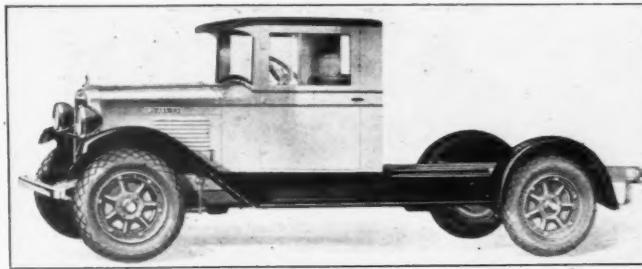
The engine is a 3½ x 4½ in., valve-in-head Wisconsin F capable of developing 45 horsepower. Lubrication is by pressure to all crankshaft and connecting rod bearings. Carburetion and ignition are furnished by Zenith and Auto-Lite equipment respectively. Gasoline feed is vacuum. The cooling system includes a Long radiator with nickel plated radiator shell.

The transmission line consists of a Borg & Beck dry plate clutch, three-speed Brown-Lipe Model 20 gearset, Spicer universals and a Columbia Model 36000, semi-floating, bevel gear rear axle. The rear axle ratio is 4.7 to 1. Service braking is through four-wheel, internal mechanically operated equipment. The emergency brake is mounted on the propeller shaft. Steering is through Ross gear.

Standard equipment includes Moto Meter, electric starting and lighting equipment, air-cleaner, oil filtrator, speedometer and tire carrier.

I. H. C.

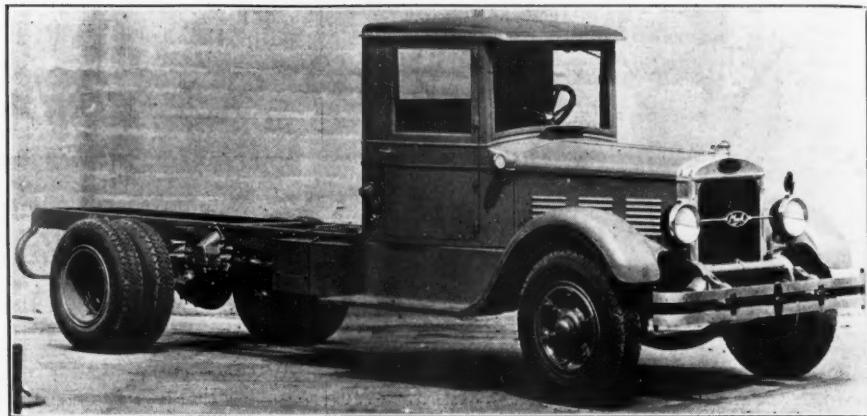
A NEW one-ton model designated as the Six-Speed Special and incorporating a two-speed rear axle has just been placed on the market by the International Harvester Co. The rear axle, which is of the semi-floating, spiral gear type, incorporates a two-speed, sliding gear auxiliary transmission. This transmission has a direct drive and a reduction in low of approximately three to one. In connection with the 5.33 to 1 reduction of the rear axle this truck provides the following gear ratios: With



One-ton Indiana Ranger Model 200. It is equipped with a six-cylinder engine and four-wheel brakes. The wheelbase is 137 in.

auxiliary in direct 18.12 to 1, first; 10.39 to 1, second; 5.33 to 1, third, and 23.72 to 1, reverse. With auxiliary in low 52.70 to 1, first; 30.23 to 1, second; 15.5 to 1, third, and 68.98 to 1, reverse. The axle housing is a malleable iron casting of the banjo type with differential pinion and two-speed mechanism assembled in a removable carrier. The two-speed mechanism consists of an integral main drive-gear and shaft into the rear end of which is piloted the spiral bevel pinion shaft. This shaft carries ten splines on which the high and low speed sliding gear travels. The countershaft, which is mounted in an extension of the carrier, is anchored and does not revolve, but carries an integral two-gear cluster on Hyatt bearings, which is constantly enmeshed and turns with the main drive gear. The front end of the main gear drive shaft is mounted on a roller bearing and on a Hyatt at the rear. Internal dental teeth on the sliding gear clutch on external dental teeth on the rear end of the main drive gear. The pinion is mounted on opposed Timken bearings at the rear, carried by a threaded and piloted cage for gear-tooth adjustment. The forward end of the pinion shaft is piloted in a Hyatt bearing in the rear end of the main drive gear. A yoke on the shifting rail mounted on the carrier controls the sliding gear.

The powerplant is a $3\frac{1}{2} \times 4\frac{1}{2}$ in., L-head engine with Ricardo head, mounted in unit with a dry-plate clutch and the three-speed transmission, and suspended from three points. This engine develops 34 brake horsepower at 2500 r.p.m. Gasoline feed is by gravity and lubrication by pressure developed by a gear-type pump. Ignition is by battery with Remy generator and distributor. Cooling is by thermo-syphon

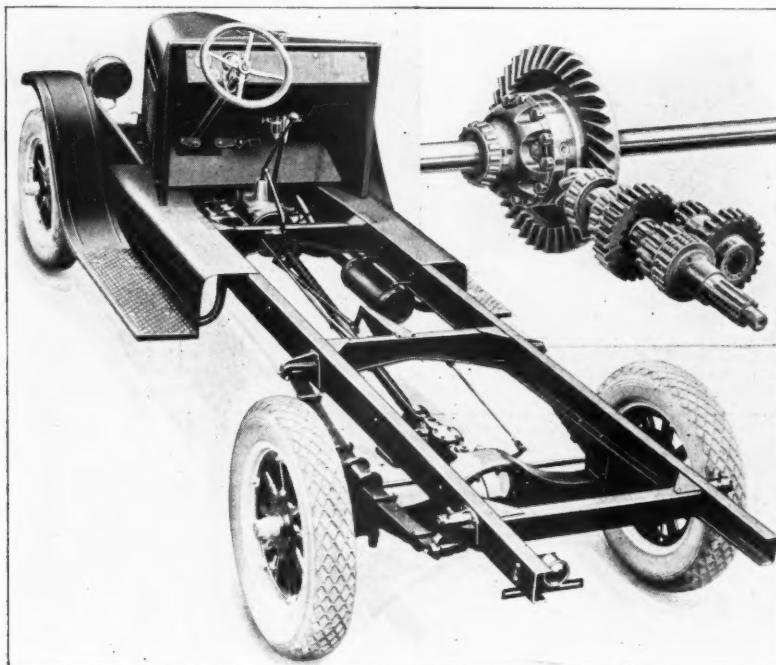


Three to four-ton Mack, six-cylinder, Model BJ Chassis. It is equipped with pneumatic tires, four-wheel brakes, four speed transmission and dual gear reduction rear axle

with centrifugal pump available.

Connection between transmission and rear axle is by a Mechanics Machine propeller shafts equipped with split ring type universals of the same make. Service brakes are internal type acting on the rear wheels, while the emergency is external acting on a drum mounted on the front end of the propeller shaft. Actuation of the service brake bands is by a tongue and lip type of camshaft. The brake band support at the rear end is by a sliding dog arrangement in the carrier which gives a floating action. Steering is through Ross cam and lever gear.

This truck is a Hotchkiss driven model, with semi-elliptic springs front and rear. In connection with the Hotchkiss drive the two-speed carrier of the rear axle was designed to be as short as possible so as to bring the rear universal close to the rear axle center line.



International Harvester's new Six-Speed Special is a one-ton model which incorporates a $3\frac{1}{2} \times 4\frac{1}{2}$ in., four-cylinder, L-head engine and a two-speed rear axle. The two-speed mechanism is of the sliding gear type

Mack

A SIX-CYLINDER engine is incorporated in the new Mack truck model BJ, details of which have just been announced by the factory. Model BJ has a rated capacity of 3 to 4 tons and is equipped with pneumatic tires, four-wheel brakes, four-speed transmission and dual gear reduction rear axle. The new unit is offered for fast service and has ample road clearance for adverse road conditions and accommodates bodies mounted above the rear wheels. It is not recommended for dump truck work.

The engine, which has the same cylinder dimensions as the AL bus engines, $4\frac{1}{4} \times 5$ in., has cylinders cast in block. Cylinder heads are cast in pairs of heat-treated aluminum alloy with turbulence type offset combustion chambers. Pistons are also of aluminum alloy of the constant clearance type with Invar struts. Connecting rods are tubular, machined all over, with lower end bearings $2\frac{1}{2}$ in. diameter. Piston pins are ground and lapped and are locked in the rods.

Main bearings of the crankshaft are $3\frac{1}{2}$ in. diameter and the shaft is drop-forged with integral counterweights and is case hardened. Crankcase is of aluminum alloy and is supplied with inspection ports on the left side. The front end drive is by a train of three gears with a cross-shaft for operation of pump and distributor. The crankshaft and camshaft gears are upset drop forgings with helical teeth and the cross shaft gear is of bronze.

A rustless type water pump is employed having an aluminum body, bronze rotor and stainless steel shaft. Radiator, which is of the continuous finned tube type with aluminum tanks and side plates, is mounted on rubber shock insulators. The fan is 22 in. in diameter and is driven by a V-belt.

Lubrication of the engine is by both force feed and splash. Tandem oil pumps supply oil separately to splash troughs and under pressure to main and connecting rod bearings. An air bell is incorporated in the oil line to reduce oil hammer and an oil filtrator also is fitted.

Ignition is by battery and North East distributor, the latter being equipped with automatic and manual advance. Starter and generator are of North East make of 12-volt type.

A single plate dry clutch is employed and rubber torque insulation is used on the driveshaft. The four-speed transmission is mounted amidship on rubber. The drive line incorporates two shafts with four Spicer universals. Under load the drive is almost in a straight line.

A full-floating rear axle with one-piece drop forged banjo member and dual gear reduction is used. Reduction is by both bevel and spur gears. Drive is taken through the springs.

Service brakes are of the internal rigid shoe type operating on 16 by 6 in. rear drums and 18 by 3 in. front drums. A vacuum booster is used for service application although straight pedal application can be made, in the event of failure. The hand brake which is located on the driveshaft at the rear of the transmission case is of the disk type.

The frame is heat-treated of tapered section and it incorporates four tubular and three channel section cross members. Springs are semi-elliptic front and rear and are mounted in rubber shock insulators.

A reverse Elliott front axle is employed, and this unit has heavy T section between spring perches and ends. The tie-rod has ball joints with micrometer adjustment, and this unit and the drag link are straight.

A worm and complete gear type steering gear is used and the assembly includes Hyatt bearings on the worm gear shaft and ball bearings on the worm shaft. The wheel is of rubber and fabric and the column which is raked is supported at the cowl by a rubber insulator.

The cab is of the de luxe enclosed ventilated type and is shock insulated from the chassis. A 30 gal. gasoline tank is mounted in the cab with filler spout and level gage extending through the side cab. Gasoline feed is by triplex electric pump.

Three wheelbases are available, 168½ in., 192½ in., and 218 in. Body space in back of the cab is 12 or 16 ft. Wheel

gage is 71½ in. front and 66 in. rear. Tires are 36 by 8 in. high pressure pneumatic all around with duals on the rear wheels.

Selden

A NEW two-ton model equipped with a six-cylinder engine, four-speed transmission and four-wheel brakes is being offered by the Selden Corp. in three wheelbases, 151, 163 and 181 in. providing 10, 12 and 14-ft. loading spaces respectively. Chassis weight is 4600 lb. and body allowance is 950 lb.

The powerplant is a six-cylinder 3% x 4½ in. Continental C-15 and develops 70 hp. at 3200 r.p.m. Starting, lighting and ignition is by battery with coil and distributor for ignition. The fuel system includes a 15-gal. tank located under the seat and a vacuum tank. The radiator is of the cellular type with nickel-plated shell.

The dry-plate clutch and four-speed transmission are mounted in unit with the engine. Power is transmitted to the rear through a two-piece propeller shaft equipped with self-aligning center bearing and grease-tight metal universal joints. The rear axle which is of the bevel gear type provides a final reduction of 6½ to 1. Drive is taken through ball and socket type radius rods.

Four semi-elliptic springs, 41 x 2½ in. front and 50 x 2½ in. rear support a pressed steel frame of 5¾ in. section, 3½ in. flange and ¼ in. stock. The front and rear end of the rear springs are not shackled, but contact against brackets. Under this type of construc-

tion as the load is applied the length of the springs supporting it shorten and the rate of deflection decreases. Service braking is through Lockheed hydraulic system acting on 16 x 2½ in. drums mounted on front and rear wheels. The emergency brake is located on the driveshaft.

Steering is by Ross cam and lever type gear. Standard wheel and tire equipment is metal spoke type with 30 x 5 in. pneumatic duals rear. Optional 32 x 6 in. tires are available at extra cost.

Walter

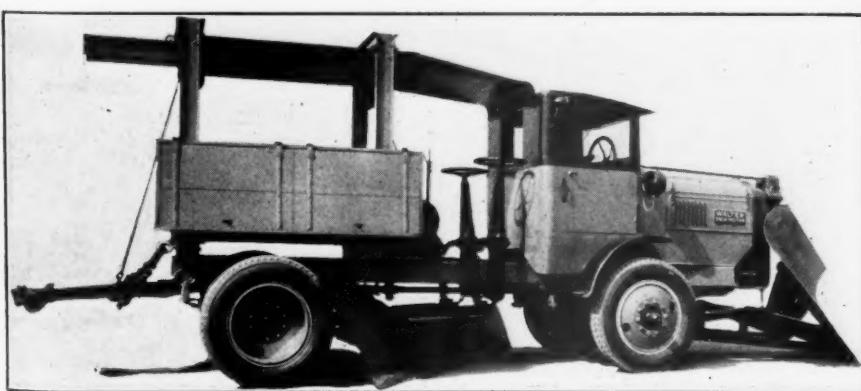
Wrecker equipment which can be mounted on the Walter Snow-Fighter, made by Walter Motor Truck Co., Long Island City, N. Y., includes a power winch, side tool boxes, overhead I-beam and a hinged A-frame for towing. The A-frame is designed for towing either end of a disabled vehicle with wheels off the ground. At the apex of the A is a swivel which is attached to the axle of the disabled vehicle. The vehicle is then raised by a cable attached to the overhead I-beam and the two-speed power winch. The A-frame is attached to the chassis frame by means of hinge joints placed forward of the rear shackles of the rear springs.

Pierce-Arrow Adopts Gross Weight Rating

IN the new "Condensed Data Quarterly" issued for the use of distributors, dealers and salesmen of the Commercial Car Division of the Pierce-Arrow Motor Car Co., of Buffalo, N. Y., the newer method of rating commercial cars, based on the vehicle's gross weight, is outlined for the first time. Commenting on this, Hal T. Boulden, manager of the Commercial Car Division, said: "For a long time we have felt that the tonnage rating, as applied to commercial cars, was obsolete, and while it is time the V. G. W. method which we are now applying to all our models is not new, we feel that it has sufficient merit to warrant general use and application in determining the payload as applied to our various commercial car chassis."

Continuing, Mr. Boulden said: "As a basis of determining the V. G. W. ratings to our various units each

(Turn to page 32, please)



The Walter Snow-Fighter can be furnished with wrecker equipment, including power winch, side tool boxes, overhead I-beam and a hinged A-frame for towing

Watson Rubber Flow Stabilizers

John Warren Watson Co.
Philadelphia, Pa.

A RUBBER-BASE material which provides a "flowing" action when moved in contact with steel surfaces is used in the new Watson Stabilizer. The action is not changed by temperature or moisture, according to statement issued by the company and there is freedom from chatter, groans or other noise. The term "Rubber Flow" has been adopted to describe the operating principle of the mechanism.

An increase of power range between minimum and maximum spring deflection to 18 to 1 instead of the former 2½ to 1



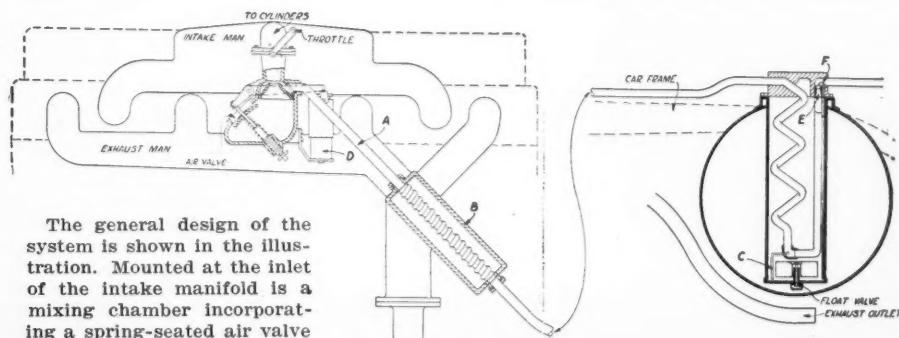
has been achieved in the new Stabilizers. That is, if there is one unit of resistance when the springs are at rest there is 18 times as much when the springs are deflected to the maximum.

The brake mechanism comprises a steel brake coiled about which is a brake shoe composed of the new rubber-base material. When the vehicle springs are at rest this shoe is practically free of contact with the drum. As the spring is deflected the strap is drawn into the housing and the brake shoe increases both the area in contact with the drum and the pressure. The coil spring serves a double purpose of bringing the shoe into contact with the drum and providing a variation in the amount of resistance of the braking member.

Direct Fuel System

Stewart-Warner Speedometer Corp.,
Chicago

A FUEL system in which carbureting action takes place in the main fuel tank and a semi-vaporized non-combustible mixture of gasoline and air is brought forward on the chassis and mixed with cold air just below the throttle has been developed by the Stewart-Warner Speedometer Corp. The new system takes the place of conventional carburetor and fuel feed system.



The general design of the system is shown in the illustration. Mounted at the inlet of the intake manifold is a mixing chamber incorporating a spring-seated air valve

balanced by means of a dashpot. About four-fifths of the mixture entering the manifold is cold air entering through the valve, the other fifth being a non-combustible mixture of gasoline vapor and hot air which enters the mixing chamber around the outside of the venturi through pipe A, under direct suction from the intake manifold in proportion to the air velocity. For full vaporization of the fuel in this mixture the stove B is provided.

In the main tank, usually placed at the rear of the vehicle, an inlet air pipe is provided which passes down into a container in the gas tank, as shown in the drawing. This pipe is equipped with two venturis in each of which are located gasoline jets, the lower one, C, being for low speed operation and the upper one, F, being for high speed operation. A constant level of gasoline is maintained in this compartment by a poppet valve operated by a cork float, the function being similar to that of a carburetor float.

Gasoline entering the pipe is atomized and partly vaporized and this action is assisted by heat absorbed by the air in its passage through the muffler before entering the pipe. The mixture of partly vaporized fuel and air passes up through the helical tube shown. On the way to the intake manifold the mixture passes through an exhaust heated stove B previously mentioned. Here the heavy ends of the fuel are vaporized and the lighter ends have been vaporized during the passage through a ¾ in. tube from the fuel tank at the rear.

When the engine is accelerated the system provides a variation of mixture ratio for accelerating from various speeds, the richness of the ratio being inversely proportional to the engine speed at the start. In other words, its action is that of an automatically graduated accelerating well. This action is brought about by the dashpot D, which is of the air-bled plunger type, restricting the entrance of air and bringing about an increased velocity of air in the pipe. This increased velocity results in picking up some of the additional condensed fuel in the pipe.

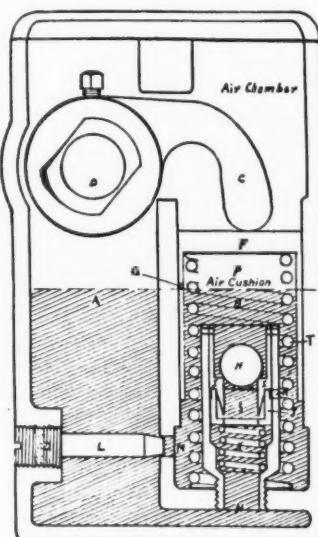
Hydro-Check Shock Absorber

Continental Motors Corp.
Detroit

THIS new absorber, which combines the pneumatic and hydraulic principles for cushioning road shocks, is of the plunger type. For light shocks the absorber works against air, but for heavy jolts the action is against oil with practically free action at center. The unit consists of a cast iron housing, the interior of which is divided into high and low pressure compartments, each containing both oil and air, a compression piston, rocker shaft and cam and exterior arm.

When the vehicle strikes a bump tension is removed from the arm and cam (see illus-

tration), causing the piston to rise through the action of the spiral spring, thus causing a partial vacuum in the high pressure chamber, which in turn causes oil to be drawn through an intake port in the bottom of the chamber (N), fitted with a ball check valve and a silencer spring. Rebound causes the arm and cam to depress the cylinder, compressing first the air and then the oil, forcing the latter to escape into the low-pressure chamber through a needle valve located low down in the partition between the two chambers. Should the pressure from a heavy jolt be such as



A—L. P. Chamber
B—H. P. Chamber
C—Cam
D—Crank Shaft
E—Piston
G—Air Intake Port
H—Oil Intake Port
I—Valve Retainer
J—Relief Valve
K—Piston
L—Relief Valve
M—Seepage Port
N—Oil Intake Port
O—Adjusting Screw Lock
P—Piston Air Chamber
R—Relief Valve Intake Port
S—Oil Intake Port (same as "N")
T—Retriever Spring

to endanger the mechanism, a relief valve, held in place by a spring and sliding in the circular wall of the intake port below the check valve (R), is forced open to permit additional seepage by way of the intake port. The air cushion is maintained above the oil level in the high pressure chamber by a port in the piston skirt at a point that permits air to enter from the low pressure chamber as each piston movement lifts the port above the semi-circular partition between the chambers. Thus with each stroke air is trapped in the high-pressure chamber. The refilling port is located at a point above the oil level (A), in the low compression chamber. The needle valve is adjustable from the outside, upon the removal of a straight-threaded plug and packing.

Punch and Riveter
Automotive Tool Mfg.
Co.

4th St., Milwaukee



THIS tool is designed for work on brake bands and clutches. It can also be used as a punch, the change from riveter to punch being made in a few minutes. Price with punches and riveting dies \$12.

DeVilbiss Spray Gun

The DeVilbiss Co.
Toledo, Ohio

GRADUATED adjustment of the spray head controlling both character and width of the spray is a feature of the new spray gun recently placed on the market by this company. A ball and cone con-



struction is embodied in the nozzle to keep the tip and air cap concentric at all times. The spray head is detachable and is interchangeable with other heads with different sizes of nozzles and also with a non-adjustable spray head.

A suction feed cup attachment is available. This unit has a lid clamped on top of the cup by means of a yoke and lever which permits easy disconnection.

Hall Hone With Micrometer

Hall Mfg. Co.
Toledo, Ohio

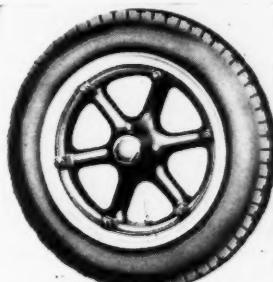


HALL cylinder hones are now equipped with micrometer sets. By means of the micrometer, guess-work and repeated gaging are eliminated when working to correct clearance. The operator sets the tool to remove a definite amount of metal after the first run has been made and the cylinder cleaned up. Other refinements also have been incorporated to make the hone chatter-proof and adding to ease of paralleling.

Dayton Light Steel Wheel

Dayton Steel Foundry Co.
Dayton, Ohio

CAST in one piece from electric-furnace steel, this wheel designed for light trucks, is of the Dayton hollow-arch bolt construction, integral hub and felloe.



The wheel can be conveniently mounted on and removed from the axle and the

valves are easily accessible. Rim slippage is said to have been completely eliminated. The wheel is cast in one piece, machined at one set-up and bearing hole bore, brake drum pilot and tread are concentric.

Five-ton Shop Jack

Manley Mfg. Co.
York, Pa.

THE Manley shop jack is now available in a 5-ton model which has a lift of 31 in. and an extension screw which



adds 10 in. to the total height. The price is \$80.

Angle Blade Valve Reamer

Keystone Reamer & Tool Co.
Millersburg, Pa.

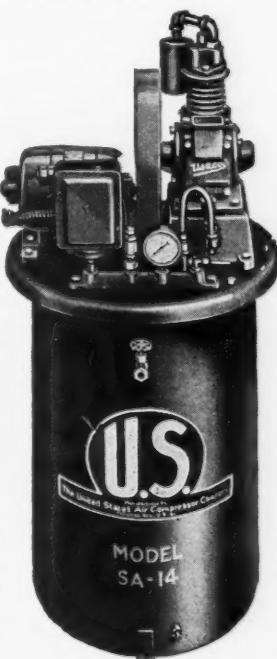


THIS valve reseating tool has blades cut on an angle, which construction is claimed to provide a "shear-cut" in re-facing valve seats. It is available in all standard sizes.

Friction Drive Air Compressor

United States Air Compressor Co.
Cleveland, Ohio

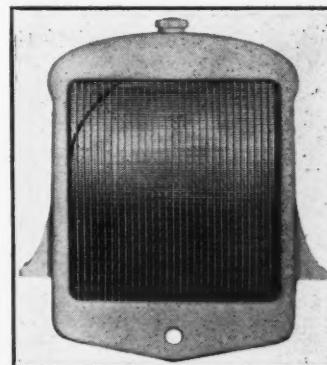
FRICTION drive is employed in the model SA-14 air compressor illustrated which is equipped with a 1/3 hp. electric motor and a single cylinder compressor mounted on the top of a vertical tank of 20 gal. capacity. The unit has a displacement of 1 1/4 cu. ft. per minute and is designed to maintain tank pressure of 115 to 150 lb.



Young Bus Radiator

Young Radiator Co.
Racine, Wis.

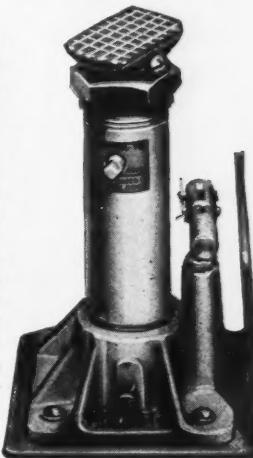
THE above company has brought out a heavy duty bus radiator with cast aluminum shell, pressed brass tanks and rugged tubular core. The tubes, header plates and tanks are of heavy construc-



tion. All inlet and outlet connections are reinforced. Tubes are of the lock-seam type and have large passages.

Eveready Oil Jacks

Charles P. Rogers & Co.
198 Pacific Ave., Jersey City, N. J.



Three sizes

THREE sizes of Eveready hydraulic jacks are designed for truck and bus work. Model 2, intended for light trucks has a rise of 5 1/4 in.; model 5, illustrated, has the same lifting range for buses and trucks and the model 10 for heavy trucks has a lifting range of 6 1/2 in.

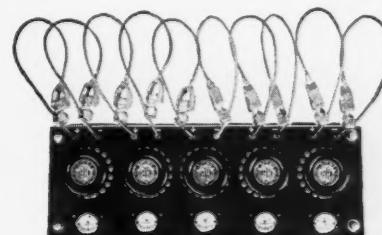
Vary-Rate Panel

Hobart Bros. Co., Troy, Ohio

THIS gives the charging rate wanted for any battery on the line, regardless of its age or condition.

Provides a separate ammeter and separate rheostat for each battery so it is unnecessary to change a single connection to vary the charging rate as desired.

Attractively finished ebony asbestos board. Each panel equipped with five ac-



curate reading ammeters, five rheostats and the exclusive HB plug-in type connecting leads for five batteries. Rheostats are same type as used on HB constant potential chargers.

Have You Heard That ~

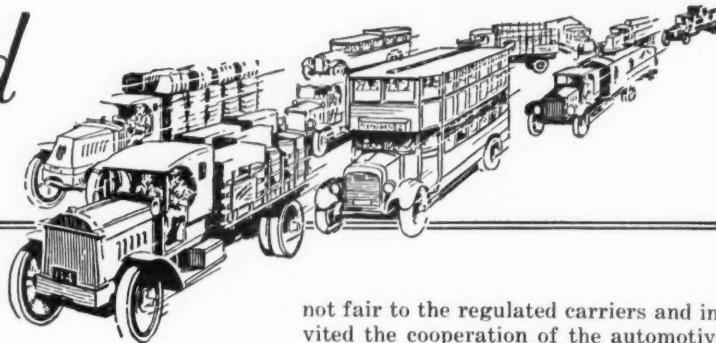
A DEALER selling a truck with body built on chassis is not a manufacturer, according to the recent decision by the U. S. Court of Claims. B. F. Hoffman, in August, 1923, received a notice and demand for \$4961 manufacturers tax from the Internal Revenue Bureau. He paid under protest and appealed his case to the Court of Claims. There he showed that he obtained the chassis complete from Ford Motor Co., at a list price less 20 per cent discount, with the manufacturers tax added thereon, and that bodies selected by customers from catalogs were obtained on the same basis. As an accommodation the body company attached bodies to the chassis. Customers are billed separately for the chassis plus tax and for the body plus tax. The Court held that Hoffman could not be considered a manufacturer, despite a previous case where a dealer combined bodies and chassis, buying each from different manufacturers, and mounted the bodies on the chassis, selling the completed truck at retail.

Col. George W. Blackington, head of the shock absorber division of Continental Motors Corp., announces the appointment of F. W. Sampson as engineer in charge of the shock absorber division.

DURING the first five months of 1928, sales of new commercial vehicles have increased about 50 per cent in the Twelfth Federal Reserve District, according to index numbers of sales constructed by the Division of Analysis and Research of the Federal Reserve Bank of San Francisco. In this period sales rose from 62 to 98 per cent of the daily average registration in 1923-25.

Neff E. Parish, founder of the Parish Mfg. Co., makers of automobile frames, died in Berlin, Germany, in June. Mr. Parish sold the plant to the Spicer Mfg. Co. in 1919. He was 65 years old.

ARRANGEMENTS have been completed for holding the annual National Standards Parts Association Show in the Cleveland Auditorium, Oct. 29 to Nov. 2. E. P. Chalfant, executive vice-president, announces that the main arena as well as the exhibition hall have been secured for the event, which will double the gross floor space for the 1928 show as compared to the space available last year.



E. J. Meyer has been appointed manager of the Autocar branch in Cleveland, succeeding Frank H. Randel, resigned. H. R. Butterfield was made dealer representative in Canton. Branches in Columbus and Cincinnati have been raised to full branch status instead of sub-stations under Cleveland.

THE Ninth Highway Safety Contest for schools, students and teachers has been announced by the National Automobile Chamber of Commerce. The contest is to be opened this fall and will carry \$6,500 in prizes.

REGULATION of interstate motor vehicle common carriers and the effect of highway transportation on rail revenues were among topics discussed at the joint meeting of representatives of automotive interests and the Motor Transport Division of the American Railway Association recently held in Atlantic City. A. P. Russell, vice-president of the New Haven R. R., said that the present basis of competition was

not fair to the regulated carriers and invited the cooperation of the automotive industry in finding the solution of this problem. In stating the position of the vehicle makers, A. J. Brosseau, vice-president of the National Automobile Chamber of Commerce, explained that while the manufacturers are not opposed to the regulation of buses in principle, they have found it necessary to oppose certain attempts to translate this principle into legislation because the regulation proposed would have been unnecessarily restrictive to the growth of motor transportation. B. F. Fitch, president of Motor Terminals, Inc., said that what was needed was less and not more regulation. Business taken from the rails by the motor carriers was generally of an unprofitable type for the railroad, in the opinion of Frank McManamy, member of the I. C. C. Frank Fageol predicted the advent of larger buses for operation over distances of 200 to 300 miles at 2 cents per mile per passenger. The next meeting of the division will be held in Detroit, October 24 and 25.

R. P. Henderson, vice-president in charge of sales for Martin-Parry Corp., York, Pa., and Indianapolis, Ind., left that organization on July 1. His future plans are unannounced.

AS of June 1, 1928, 64 railways were operating 1047 motor coaches as against 800 operated by 52 companies last year. Routes increased from 200 to 340 and aggregate route mileage from 8000 to 14,805. Forty-five railroads in addition to those carriers utilizing joint terminal motor service at St. Louis and Cincinnati now operate 4902 trucks, tractors and trailers as compared with 3300 operated by only 31 roads.

Net earnings of the American Car & Foundry Co. for the year ended April 30, 1928, after taxes, replacements, etc., totaled \$3,754,555. This compares with \$4,593,378 for the corresponding period of last year.



J. P. Heil now heads the Heil Co., Milwaukee, Wis., which recently absorbed the Hydro Hoist Co. He was formerly vice-president and treasurer of the Heil Co.

SALES of replacement parts for the first five months of 1928 show an increase of 17.57 per cent over the corresponding period of last year, according to a report by the National Automotive Parts Association. The total annual gain during 1927 was 19.1 per cent over 1926. The association predicts that if the volume during the summer months shows an increase relative to that of last summer the parts group will enjoy an even larger percentage of increase in 1928.

AT a conference of a number of representatives of truck manufacturers held at the Book Cadillac Hotel in Detroit the Associated General Contractors of America, Inc. made a plea that truck manufacturers tighten up selling terms as a means of discouraging irresponsible parties from entering the contract hauling field and thereby jeopardizing the future of that industry for responsible operators. While the representatives of most of the companies were of the opinion that such action would be beneficial, no definite action was taken and indications were that the contractors will call a similar conference at a later date when efforts will be made to get a greater representation from truck industry present.

Edwin G. Thompson, vice-president Thompson Products, Inc., Cleveland, recently issued a statement that \$750,000 will be spent for factory additions in Cleveland and in Detroit to take care of the present schedules which are outgrowing the company's present capacities.

WHILE an injunction to restrain the proposed \$250,000,000 merger of the Dodge and Chrysler companies was recently refused the Dodge minority, the New York Supreme Court ordered that the Dodge Corp. file a bond guaranteeing protection to the interests of all preference stockholders not consenting to the merger. A stipulation also must be filed that the plan shall not be consummated and a transfer of Dodge assets made unless the application of the bond at time of transfer be assumed by the Chrysler Corp.

The Highway Trailer Co., Edgerton, Wis., recently announced that it opened a direct factory branch at 603 Washington Ave., N., Minneapolis, Minn., to be known as the Twin City branch.

DURING the first four months of 1928, 16 per cent of all the cattle, calves, hogs and sheep were trucked to the 13 principal markets of the country, according to statistics compiled by the National Provisioner. All the principal markets are making provision for special facilities for unloading trucks. Because of the market together with improvements in methods of loading and farm handling, trucked-in stock show fewer bruises and injuries than was true when this method of transportation first was undertaken by the shippers.

Selden Truck Corp. has made arrangements with the Grez International Corp. to handle its export of New York City business under the name of the Selden Truck Corp. export department.

THE exportation of 3814 units of Dodge Bros. cars and Graham Bros. trucks during May, represented an increase of 17.5 per cent over May a year ago, and 29.3 per cent over April, 1928 according to Dodge Bros., Inc.

Col. Charles Clifton, honorary president of the National Automobile Chamber of Commerce, and chairman of the board of Pierce-Arrow died at his home in Buffalo, N. Y. Col. Clifton, one of the pioneers of the industry, joined the George N. Pierce Co. of Buffalo in 1897, becoming president of their company in 1916 and chairman of the board in 1919. He also served as president of the National Automobile Chamber of Commerce for 23 years, from its inception in 1904. He acquired his military rating in the course of 12 years' service in the New York National Guard. He was born 74 years ago.

MAJOR Court Decisions on Motor Carrier Operation is the title of a volume which the Bus Division of the American Automobile Association of Washington, D. C., is planning to publish about October 1, 1928. The new book will present all important court decisions which in any way establish or reaffirm precedent in the operation or regulation of motor carriers for hire. The volume will be indexed and digested in such a way that in brief it can be outlined in a very few minutes. The Bus Division is now accepting orders for the book at \$10 per copy and offers a loose leaf supplement service for one year at an additional cost of \$5.

Howard Hughes was elected president of the Pennsylvania Bus Association at its annual meeting in Harrisburg.

A LINE of six-cylinder school buses in capacities ranging from 18 to 52 school children and equipped with four-wheel Lockheed hydraulic brakes and four-speed transmissions has been announced by Graham Brothers, motor coach division of Dodge Brothers, Inc. Seating arrangement and design are the result of a survey in which the dimensional requirements for the comfortable seating of children of all ages was studied. Seats are of leather, with spring cushions and with heavily padded backs. Entrance is controlled by the driver, although an emergency exit is provided at the rear.



One of the new line of six-cylinder Graham Brothers buses recently announced by Dodge Bros., Inc.

AN amendment to the Ohio State bus law is being sought by the Board of Governors of the Ohio Motor Bus Association. Bus companies want the same rights as railroads and street railway lines such as changing schedules when necessary without the delays which bus companies are subjected to and permission to keep pace with their growth by increasing their equipment. It is said that the present bus law makes it impossible for certain lines to use improved equipment. Before seeking relief from the state body, it is the association's intention to acquaint the public with its desire through a statewide advertising campaign. The changes as recommended by the Ohio association were endorsed by the legislative committee of the American Automobile Association.

Gleen L. Moyers has joined the Handy Governor Corp. of Detroit, as sales manager of the governor division, according to an announcement by A. A. Bull, president. Mr. Moyers formerly handled the sales of the Monarch Governor Co.

THE creation of a new meter which measures engine speed 25 times a second is enabling the Bureau of Standards to discover the degree to which low-test gasoline will permit acceleration, the Department of Commerce announced. The device consists of a tape on which electric discharges at the rate of 25 times a second record the engine speed, and it has been discovered already, the bureau announces, that the type of carburetors with "wells" allow good pick-up with low test gasoline and lean mixture.

Thomas P. Henry, Detroit, was reelected president of the American Automobile Association at the closing session of that body's annual convention in Cincinnati. Mr. Henry has been elected to that office for the sixth time.

REPRESENTATIVES from more than 30 manufacturers, fire chiefs, firemen's associations and fire underwriters recently met in Washington to discuss standardization of fire engines under the auspices of the division of simplified practice of the Department of Commerce. It has been suggested that standard capacities of 300, 400, 500, 750 and 1000 gal. per minute for the fire engines be produced.

Charles W. Monahan has resigned as assistant merchandise service director of the National Standard Parts Assn. to become a sales representative of Diamond Motor Parts Co.

ROCKWAY MOTOR TRUCK CORP. is building a new factory branch in Schenectady, N. Y. It will contain about 10,000 sq. ft. and cost approximately \$70,000, according to John C. Cahill, Schenectady manager.

J. H. Weatherly has been appointed sales representative for the Splitdorf Electrical Co. in the states of Indiana, Wisconsin, Illinois and Iowa. A. N. Nichols also was appointed to operate in the Kansas City territory under C. S. McMorrow, in charge of the territory.

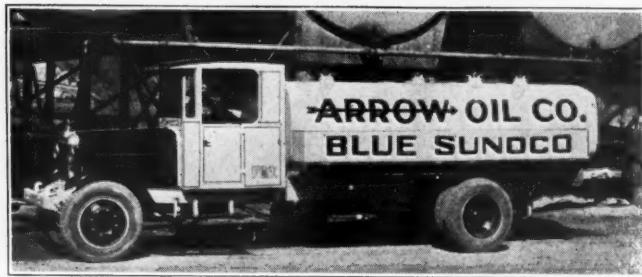
WALTER MOTOR TRUCK CO. has brought out a new three ton, heavy duty unit known as the Walter Contractor Special. The wheelbase is 100 in. and the overall length with 8-ft. body is 187 in. It is equipped with a six-cylinder, 4 1/4 x 4 3/4 in. engine, five speed transmission, external brakes and pneumatic tires.

The Department of Commerce announces that the municipality of San Diago, Chile, will open bids for 87 trucks of 1 1/2-ton capacity, to be used for street cleaning service in that city immediately.

A 72-PAGE piston ring specification book was recently published by the American Hammered Piston Ring Co. It contains instructions for the proper installation of piston rings, junk ring specifications for Knight engines, piston ring specifications for practically all automotive vehicle, and interchangeability tables showing which engines use rings of the same specifications. The data on the interchangeability table goes back as far as 1919.

Completion of new branch buildings in Portland, Me., Syracuse, N. Y., and Davenport, Iowa, has been announced by officials of the Goodyear Tire & Rubber Co.

ARTHUR M. HILL, West Virginia, and George P. McCallum of Michigan, were re-elected chairman and vice-chairman of the bus division of the American Automobile Association at the second annual convention of that body held in Cincinnati, June 27th. Chairman Hill said that the two major objectives of the division during the coming year would be the enactment of Federal regulatory legislation and making the division self-supporting financially. The program of the convention was replete with interesting features on regulation, traffic promotion, operation and maintenance. Frank Fageol, Twin Coach Corp., expressed the opinion that because of recent development of buses of large carrying capacity, the claim can no longer be sustained that fixed rail cars are more efficient in handling mass transportation than the modern motor coach. His paper is reproduced elsewhere in this issue. The address of H. P. Fritch, president of the Boston and Maine Railroad's bus operating subsidiary, pictured a bright future for the bus in coordination with rail service. Following a heated criticism of the opposition of the National Automobile Chamber of Commerce toward the Parker bill in which S. A. Markel charged that the Chamber's objections were designed



Latest addition to the fleet of the Arrow Oil Co., Lansing, Mich. The body, which has a capacity of 1200 gal., is mounted on a Duplex Model SAC, 3-ton chassis.

to delay congressional action, Edward F. Loomis of the N.A.C.C. stated that his organization favored regulation in principle, but is opposed to regulation of the type contemplated in the Parker bill. Among the speakers were E. Blythe Stason, Prof. of Law, University of Michigan; E. A. Keenan, advertising manager, Mitten Tours, Philadelphia; M. S. Aldrich of West Virginia; A. E. Hutt, Vacuum Oil Co.; Guy A. Huguet, president Consolidated Coach Corp.

Menhall has been president of both corporations and continues at the head of the highway company.

Continental Motors Corp. reports net profits of \$807,497 for six months ended April 30, which compares with \$147,084 for the corresponding period last year.

DIRECTORS of the Pierce-Arrow Motor Car Co. at a recent meeting submitted a plan to its stockholders whereby the Studebaker Corp. will put \$2,000,000 cash into the new Pierce-Arrow company's junior securities. Myron E. Forbes in a statement said that the affiliation will permit the full utilization of facilities at the Buffalo plant. Approval of the plan will combine two of the country's oldest automotive manufacturers with plants and assets estimated to be worth \$160,000,000.

The International Harvester Co. has purchased as an addition to its Milwaukee works, the buildings and real estate of the Northwestern Malleable Iron Co.

Coming Events

SHOWS

American Electric Railway Association, Public Auditorium, Cleveland Sept. 22-28
American Road Builders' Association, Inc., Cleveland Auditorium Jan. 14-19
Automotive Equipment Association, Coliseum, Chicago Oct. 22-27
*Chicago Jan. 26-Feb. 2
National Standard Parts Association, Cleveland Auditorium Oct. 29-Nov. 3
*New York, Grand Central Palace Jan. 5-12

*Will have Special Shop Equipment Exhibit.

CONVENTIONS

American Electric Railway Association, Public Auditorium, Cleveland Sept. 22-28
American Road Builders' Association, Inc., Cleveland Auditorium Jan. 14-19
Automotive Equipment Association, Coliseum, Chicago Oct. 22-27
National Association of Automobile Show and Association Managers, Before-Shows, Drake Hotel, Chicago July 26-27
National Standard Parts Association, Hollenden Hotel, Cleveland, Oct. 29-Nov. 3
World Motor Transport Congress, Rome Sept. 25-29
S. A. E.

Detroit, Annual Meeting Jan. 15-18
New York, Annual Dinner, Hotel Astor Jan. 10
Transportation Meeting Oct. 16-18

The British government recently passed a bill giving the leading railway companies of the country the power to compete on the road with motor traffic.

PERFECT CIRCLE CO., Hagerstown, Ind., has acquired the General Piston Ring Co., Tipton, Ind., and the capitalization of the Perfect Circle Co. will be increased to \$4,875,000. The management of the reorganized Perfect Circle Co. will remain the same.

General Motors of Canada established a production record in May when 17,772 cars and trucks were shipped from Oshawa and Walkerville, France.

A. T. Colwell of Thompson Products Inc., has been made sales and engineering representative of the original equipment division for the State of Michigan. Mr. Colwell has been with Thompson Products for six years, covering the eastern and Michigan territories.

THE Highway Trailer Co., Edgerton, Wis., has increased its capital stock to \$1,000,000 following the absorption of its subsidiary, the Continental Axle Co., also of Edgerton. James W.

Menhall has been president of both corporations and continues at the head of the highway company.

Continental Motors Corp. reports net profits of \$807,497 for six months ended April 30, which compares with \$147,084 for the corresponding period last year.

TRUCK sales in June continued to hold their own in the Atlanta, Ga., territory, according to reports from the larger distributors, and showed substantial gains over the same month last year, although slightly less than they were earlier in the year. While Kansas City reported a slight slowing down of sales, wheat crops, which will be on the market soon, are expected to stimulate activity. Dallas reported conditions as satisfactory with plenty of money in circulation and credit fairly easy. Dealers are optimistic over the outlook. General business conditions in Milwaukee are reported as good and motor truck business is comparable to a year ago. Reports from various points in Michigan indicated a continued heavy demand for both passenger and commercial cars. Business and industrial conditions in the Seattle section are stated to be generally good with every indication of a record year for the farmers. New Orleans reports that there is a marked trend of sway from heavy to light trucks. The passage of the Flood-Control bill has helped business considerably in this section. General business in Los Angeles is reasonably good and the truck market shows considerable improvement.

LINE CONTACT Helps Control ROAD SHOCK

*An Exclusive
ROSS
Feature*



THE extraordinary ability of the Ross Cam and Lever Steering Gear to control road-shock, without the loss of road sympathy, results largely from a mechanical feature exclusive to Ross—*line contact* between actuating and actuated members... Here's what happens when your front wheels hit an obstacle in the road—and all so quickly you can hardly imagine it:

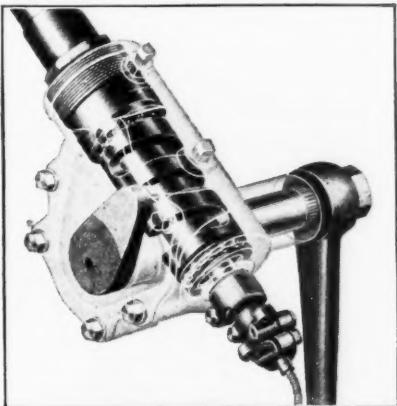
The impact forces the lever stud against the wall of the cam thread with a pressure that squeezes the lubricant from between their surfaces at the line of contact. The added friction thus produced at the peak of the impact, tends to stop all movement of the cam, and consequently prevents the heaviest shock from reaching the steering wheel.

The instant the first high pressure is released the lubricant penetrates between the surfaces, and the lever takes its natural course, well lubricated, for the stud has a *rolling* as well as *sliding* movement in the cam thread.

By the time this has happened, however, the violent shock from the road has passed, and what reaches the steering wheel is only the faint hint of road conditions, which constitutes *road-sympathy*.

Conversely, there is never any resistance to the turning of the steering wheel, for when the wheel is turned the stud glides smoothly through the groove on a wedge of lubricant.

Line contact is but one of the many features, which together have made Ross Cam and Lever Steering so widely preferred by the makers of cars, trucks and buses.



The balanced qualities of Ross Steering are largely the result of these features in which the Ross Cam and Lever Steering Gear differs from the ordinary type of steering gear:

Variable Ratio of Cam
Line Contact Between Actuating and
Actuated Members
Low Internal Pressures
Powerful Internal Leverage
High Over-All Efficiency

ROSS GEAR & TOOL CO. • LAFAYETTE, IND.

ROSS Cam AND Lever STEERING

Motor Wheel Corp. awarded a contract for the erection of a new steel and brick addition to the pressed steel plant in Lansing, Mich., to be finished in September, this \$100,000 addition will be approximately 500 x 74 ft. and will be used partly for steel storage and partly for additional assembling space for Diesel and Spoksteel wheels.

THE Pierce Governor Co. recently completed a transfer of its factory and executive office from 9th St. and Central Ave., to its new plant at 1605-1635 Ohio Ave., Anderson, Ind. The building is of concrete brick and steel and provides more than 40,000 sq. ft. of floor space.

During the recent three-day sales conference held by the Robert Bosch Magneto Co. at the Long Island City plant, the following men were added to the sales staff: John Barthel, formerly of the Kohler Co.; Robert Heck, formerly of the Splitdorf Electrical Co.; G. W. Liedholz, formerly of the Lepel Ignition Corp., and N. S. Smith, formerly of the American Bosch Magneto Corp.

AN analysis of 1927 sales by the General Motors Truck Company shows an increase of 101 per cent over 1926 for the entire line. Vocational sales gains show the following: Florists, 130 per cent; gas and oil, 101 per cent; furniture, 96 per cent; bakers, 95 per cent; food products, 92 per cent; bottlers, 52 per cent; hardware, 48 per cent; dairies, 42 per cent; laundries, 42 per cent; haulage, 38 per cent; contractors, 25 per cent, public utilities, 17 per cent, and coal and ice, 11 per cent.

O. S. Woods has been appointed sales manager of the Indiana Truck Corp. of Texas, in charge of retail and wholesale sales in the southwestern district. Mr. Woods was formerly district sales manager for Federal in the same district.

The Instruction Book—a Sales Asset

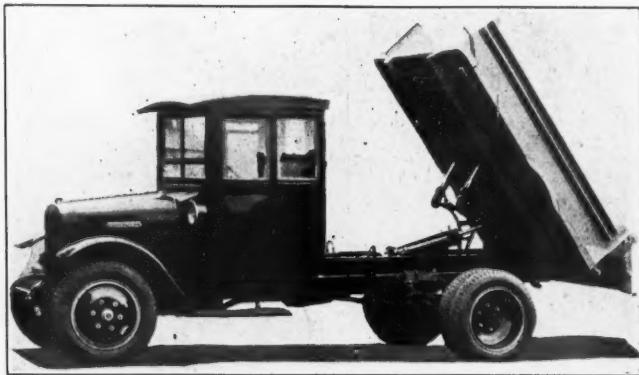
(Continued from page 21)

about different requirements in the way of lubrication and adjustment which has been overlooked.

The call gives the dealer's representative a splendid opportunity to explain the details of construction of the vehicle, its operation and maintenance at a time when the owner's interest is at a maximum.

In either case the representative, salesman or service man, makes a special call with the instruction book. He points out the value of lubrication and periodic inspection as well as preventative maintenance operations. He invites questions as to any feature not thoroughly understood.

The benefits of the plan have exceeded the cost many fold. Customer goodwill cannot be estimated on a dol-



International Harvester Model SD 46, two-ton chassis equipped with the new single cylinder Heil Hydro Hoist, H-2 and a 1½-2 yard Heil body

lars and cents basis. However, a number of live prospects have been obtained as a result of the instruction book calls. Claims that instruction books were not in the vehicle when delivered or were not received, if sent by mail have been entirely eliminated. Owners are given a proper start in operating and maintaining their newly purchased vehicles. If there is any kick about the vehicle by the owner he has a chance to make it during the call which is made within a day or two after delivery. This feature puts a stop to many complaints later.

Harry G. Moock tendered his resignation as managing director of Greater Market Development at the close of the Automotive Equipment Association convention at Mackinac Island. In his presentation of the work of the G.M.D. department, Mr. Moock pointed out that the cut in appropriation to approximately \$130,000 a year, did not in his opinion, provide an appropriation sufficient to do an effective job. N. H. Boynton has been appointed by president Arthur C. Storz to carry on greater market development work, both at the national headquarters in Chicago and in the field.

A WHOLESALE market analysis of more than 1000 towns in the United States and summarized sales and credit information regarding approximately 4000 wholesale houses in the United States and Canada will be contained in the Sales and Credit Directory of Automotive Wholesalers to be issued July 1, by the Motor and Accessory Manufacturers Association.

Don S. Brisbin has been elected vice-president in charge of sales of the Columbus McKinnon Chain Company, Cleveland, Ohio and a member of the Board of Directors.

THE American Engineering Council has prepared a report recommending uniform street signs, signals and markings for traffic control throughout all cities in the United States. The Council has been working in cooperation with the Hoover conference on street and highway safety.

Chisholm-Moore Hoist Corp., division of Columbus McKinnon Chain Co., is the new name of the Chisholm-Moore Mfg. Co., recently purchased by the Columbus McKinnon Chain Co., Tonawanda, N. Y.

H. C. Schuette, assistant automotive freight commissioner of Europe, says in advices to U. S. Dept. of Commerce that more than 32,000 of the A.E.F. trucks left in France in 1918 are still in active service. These trucks have been kept in repair by a number of French automobile dealers who bought up entire spare parts depots at the end of the war.

FRANK M. HARRINGTON, of Philadelphia has been appointed merchandising director of the National Automotive Parts Association. Mr. Harrington formerly was district manager of the Celeron Co., division of Diamond State Fibre Co., manufacturers of Celeron timing gears.

June construction contracts in the territory East of the Rocky Mountains amounted to \$650,466,200 or three per cent ahead of June, 1927, and 2½ per cent under May, 1928, according to compilations by F. W. Dodge Corp.

THE sales branches of the VanDorn Electric Tool Co., Cleveland, in Los Angeles, San Francisco and Seattle, and its service branches in Los Angeles, Oakland and Seattle, have been supplemented by the establishment of a complete warehousing and service depot at 525 E. 10th St., Oakland, Calif. Sales departments will be operated separately with the following branch managers in charge: Waldo H. Bair, Los Angeles; Harry W. White, San Francisco, and Roy Wise, Seattle.

The appointment of A. W. Childs to the position of assistant chief of the automotive division of the Department of Commerce is now effective. Mr. Childs succeeds I. H. Taylor, who has joined General Motors Export Corp. Mr. Childs was formerly traffic manager of the Packard Export Co. of New York.

Pierce-Arrow Adopts Gross Weight Rating

(Continued from page 25)

chassis is individually weighed and the actual chassis weight is stenciled on the caution plate, as is the vehicle gross weight of the job—the body weight and the pay-load being left blank and to be filled in at the time the sale is made, based on this formula:

Weight of Chassis	Gross Weight
Weight of Body and	of Vehicle at
Cab	Tires or
Weight of Pay Load	Vehicle Gross
	Weight

"Vehicle gross weight, as stated before, is given for each model, chassis weight for each model are also given. The difference between "V. G. W." rating and chassis weight is the weight available for pay-load and body. Any weight for each model is also given, automatically added to the pay-load allowance."



CLARK TRUCK WHEELS

Every thirty seconds a new Clark Truck Wheel rolls by the watchful eye of our inspectors after passing the searching test of a 100 ton press—so much for quantity production with schedules running full speed. • •

CLARK EQUIPMENT CO.
BUCHANAN - - - MICHIGAN

With Strength of Steel

SPEEDING THE PROGRESS OF THE WORLD

The steadily increasing volume of business coming to us from the larger truck manufacturers is evidence that the single reduction bevel gear of the Clark Axle type is the accepted design for the modern motor truck.

CLARK EQUIPMENT COMPANY
BUCHANAN - MICHIGAN



CLARK AXLES

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

Those Chassis which Are Sold and Recommended for Bus Use Are Designated in the Following Table by Reference Sign (B) in Front of the Name

For Motor Bus Chassis See Pages 46 and 47

(Where prices are not given it is because we have been unable to get them from authoritative sources)

Key of abbreviation, page 48

Trade Name and Model	General		Engine		Fuel System		Type and Make		Make and Model		Front Axle Make and Model		Brakes, Location		
	Front (Inches)	Rear (Inches)	Make and Model	Make and Model	Carburetor (Make)	Fuel Feed	Generator (Make)	Length of System (Make)	Universal (Make)	No. of Forward Speeds	Location	Rear Axle	Gear Ratio	Brakes, Location	Front Axle Make and Model
1000 Pounds															
Chevrolet Nat. Com.	305 107	S 30x4.50	S80x4.50	Own	4-3 1/4x4	21.7 H	PS	Non	P. Own	Own Nat.	S 16	13.88 E*	Own Nat.	Jax	
Durant Com. Ch.	465 103	B 23x4.75	B 28x4.75	Con	4-3 1/4x4	18.2 L	PC	Non	P. Own	Own	S 16	16.16 E*	Own	Jax	
Erskine	660 107	P 30x5	P 30x5	Own	6-2 1/2x4	18.2 L	TH	Non	P. Own	Own	S 16	5.12	15.7 G*	Own	Jax
General Motors T-11	565 111	B 23x4.75	B 29x4.75	Pontiac	6-3 1/4x3 1/2	25.3 L	PC	Non	D. Lon	Own	S 16	4.18	13.92 E*	Own	Jac
Graham Brothers SE	665 110	B 29x5.00	B 29x5.00	Dodge	6-3 1/4x3 1/2	25.3 L	PC	Non	P. B&B	Dodge	S 16	4.45	14.49 G	Dodge	Det
Graham Brothers SW	805 115	B 31x5.25	B 28x5.25	Con 16E	6-3 1/4x3 1/2	27.3 L	PC	Non	N-E P. B&B	Dodge	S 16	4.73	19.63 G	Dodge	Det
Geo Speed Wagon Jr.		B 28x5.25	B 28x5.25	Con 16E	6-3 1/4x3 1/2	27.3 L	PC	Non	N-E P. B&B	Dodge	S. S.	4.7	14.63 E	S. S.	Ros
1500 Pounds															
Graham Brothers DE	775 120	B 31x5.25	B 31x5.25	Dodge	6-3 1/4x4	27.3 L	PC	Non	P. B&B	Dodge	S 16	4.73	19.63 G	Own	Kel
Graham Brothers DEW	775 120	B 33x4 1/2	B 33x4 1/2	Dodge	6-3 1/4x4	27.3 L	PC	Non	P. B&B	Dodge	S 16	4.73	19.63 G	Own	Kel
Int. Harvester Spec. Del.	116	B 29x5.00	B 29x5.00	Wau X.A.	4-3 1/4x4	19.4 L	PC	Non	D-R	Roc	S 16	4.45	15.1 A	Own	D-G
Rugby Fast Mail.	975 110	B 32x6.00	B 32x6.00	Con	6-2 1/2x4	19.8 L	PC	Non	D-R	D. Own	S 16	4.48	14.8 E*	Own	S. S.
Stewart Buddy.	865 118	B 32x6.00	B 32x6.00	Own	6-2 1/2x4	19.8 L	PC	Non	D-R	D. Own	S 16	4.49	14.9 G	Own	Own
Studebaker Veh.	925 113	B 32x6.00	B 30x5.25	Own	6-2 1/2x4	27.3 L	PC	Non	A-L	P. B&B	S 16	4.9	14.9 F	Own	Own
1 Ton															
Acme 14.	120	P 30x5	P 30x5	Con H8	4-3 1/4x4	18.2 L	PC	Non	P. B&B	M.M.	S 16	18.73 B*	S. S.	SK267	
Acme 16.	120	P 30x6	P 30x6	Con 20L	4-3 1/4x4	18.2 L	PC	Non	P. B&B	M.M.	S 16	18.73 B	S. S.	S. S. 267	
Acorn 20P.	186 132	P 30x5	P 30x5	Con 15C	6-2 1/2x4 1/2	27.3 L	PC	Non	P. B&B	M.M.	S 16	4.73	19.63 G	Own	Blm
Biederman.	465 138	P 30x6	P 30x6	Con 8R	4-3 1/4x4	27.3 L	PC	Non	P. B&B	M.M.	S 16	4.73	19.63 G	Own	Blm
Chevrolet Cap.	465 124	P 30x5	P 30x5	Own Cap	4-3 1/4x4	21.7 H	PC	Non	P. B&B	M.M.	S 16	5.43	18.03 A	Own	Blm
Chilego AX.	121 1/2	P 32x6	P 32x6	Wau X.A.	4-3 1/4x4	19.6 L	PC	Non	A-L	P. Own	S 16	5.71	19.07 A	Own	Jax
Clydesdale 16.	140	P 34x5	P 34x5	Con 11U	4-3 1/4x4	28.9 L	PC	Non	Bos-A	P. B&B	S 16	6.43	30.86 A	Own	Blm
Commerce 8A.	180	P 30x5	P 30x5	Con 11U	6-3 1/4x4	25.3 L	PC	Non	D-R	D. Own	S 16	6.66	20.5 A	Own	Blm
Concord K.	1760 130	P 30x5	P 30x5	Bad WTTU	4-3 1/4x4	22.5 L	PC	Non	A-L	D. Own	S 16	5.60	18.46 A	Own	Blm
Corbit 20.	1365 132	P 30x6	P 30x6	Con 16C	6-2 1/2x4	19.6 L	PC	Non	D-R	D. Own	S 16	5.60	18.46 A	Own	Blm
Day-Elder M.	1365 131	P 30x6	P 30x6	Con 16C	6-2 1/2x4	27.3 L	PC	Non	D-R	D. Own	S 16	5.57	23.9 A	Own	Blm
Denby 41.	128	P 34x5	P 34x5	Her OX	4-3 1/4x5	25.6 L	PC	Non	G&O	Zen	S 16	5.8	12.2 A	Own	Blm
Diamond T76.	130	P 30x5	P 30x5	Con 18E	6-3 1/4x4	27.3 L	PC	Non	G&O	Zen	S 16	5.12	18.6 A	Own	Blm
Diamond T180.	130	P 30x5	P 30x5	Loc CT	4-3 1/4x5	22.5 L	PC	Non	G&O	Zen	S 16	5.12	18.6 A	Own	Blm
Eagle 10.	130 1/2	P 30x5	P 30x5	Loc CT	4-3 1/4x5	22.5 L	PC	Non	G&O	Zen	S 16	5.12	18.6 A	Own	Blm
Federal F6.	124	P 30x5	P 30x5	Con 30L	6-2 1/2x4	19.8 L	PC	Non	D-R	D. Own	S 16	5.85	22.3 A	Own	Blm
Federal Seal.	124	P 30x5	P 30x5	Con 30L	6-2 1/2x4	19.8 L	PC	Non	D-R	D. Own	S 16	5.85	22.3 A	Own	Blm
Fisher Jr. Express.	140	P 30x5	P 30x5	Loc CT	6-2 1/2x4	19.8 L	PC	Non	A-L	P. B&B	S 16	5.85	22.3 A	Own	Blm
Gafford 20.	136	P 30x5	P 30x5	Bad WTTU	4-3 1/4x4	22.5 L	PC	Non	A-L	P. B&B	S 16	5.85	22.3 A	Own	Blm
General Motors T-19.	745 128 1/2	P 30x5	P 30x5	Bud WTTU	6-3 1/4x4	27.3 L	PC	Non	A-L	P. B&B	S 16	5.85	22.3 A	Own	Blm
General Motors T-20.	1065 132 1/2	P 30x5	P 30x5	Pontiac	6-3 1/4x4	25.3 L	PC	Non	D-R	D. Own	S 16	5.43	37.33 A	Own	Blm
Goffredson 20 B.	1065 132 1/2	P 30x5	P 30x5	Buick Skd.	6-3 1/4x4	23.4 H	PC	Non	K-P	Own	S 16	5.57	22.28 A	Own	Blm
Gramm-Bernstein 10.	1455 131 1/2	P 30x5	P 30x5	Buick Skd.	4-3 1/4x4	22.5 L	PC	Non	D-R	D. Own	S 16	5.66	18.9	Own	Blm
Hahn S14.	136	P 30x5	P 30x5	Loc CT	6-2 1/2x4	19.6 L	PC	Non	A-L	P. B&B	S 16	5.85	23.08 B	Own	Blm
Hahn S16.	136	P 30x5	P 30x5	Loc CT	4-3 1/4x4	22.5 L	PC	Non	A-L	P. B&B	S 16	5.85	23.08 B	Own	Blm
Ind. Harv. 6 Sp.	136	P 30x5	P 30x5	Loc CT	6-3 1/4x4	27.3 L	PC	Non	A-L	P. B&B	S 16	5.85	23.08 B	Own	Blm
King Zeiler 22A.	134	P 30x5	P 30x5	Loc CT	6-3 1/4x4	19.6 L	PC	Non	A-L	P. B&B	S 16	5.85	22.7 B	Own	Blm
Kimball.	140	P 34x5	P 34x5	Loc CT	6-2 1/2x4	19.8 L	PC	Non	A-L	P. B&B	S 16	5.85	22.7 B	Own	Blm
Kleiber.	1460 136	P 30x5	P 30x5	Loc CT	6-3 1/4x4	25.3 L	PC	Non	A-L	P. B&B	S 16	5.85	22.7 B	Own	Blm

Key of abbreviation, page 48

Trade Name and Model	General		Engine		Clutch		Gears		Rear Axle		Gear Ratios	
	Front (inches)	Rear (inches)	Make and Model	Make and Model	System	Brake	Make and Model	Location	Low	High	Total Reduction	Final Drive
1 Ton—Cont'd												
Lathrabe A3.....	133	P 30x5	Con 11U	25.3 L	PC Non	Fed	Zen	Col 3500	5.10	17.1	1.8	Col 3500
Luedinghaus.....	1650	P 30x5	Wau V	25.6 L	PC Non	Own	Zen	Shu 5410	4.55	18.3	1.8	Smi Fir
Menomineus.....	1650	P 30x5	Wu SU	25.6 L	PC Non	Per	Zen	Tut 3400	5.22	18.4	1.8	Smi Fir
Reo DA.....	123	P 30x5	Con 16E	25.6 L	PC Non	Per	Zen	Tut 3400	4.45	18.4	1.8	Mot Fir
Reo DC.....	1075	P 30x5	Con 16E	27.3 L	PC Non	Per	Zen	Tut 3400	5.22	18.4	1.8	Mot Fir
Rugby Exp.	975	P 30x5	Con 18E	28.4 L	PC Non	Own	Zen	Std 3400	5.22	18.4	1.8	Mot Fir
Santow GA.....	120	S 32x6	Her OX	4.4x5	PC Non	Non	D.Ful	Col 54000	5.10	17.1	1.8	Smi Fir
Selvin 17.....	130	S 32x6	Her OX	4.4x5	PC Non	Non	D.Ful	Col 54000	4.55	18.4	1.8	Smi Fir
Selvin 25H.....	142	P 30x5	Con 18E	27.3 L	PC Non	Own	D.Ful	Col 54000	5.22	18.4	1.8	Smi Fir
Stewart, Buddy.....	995	P 32x6	Bud WTU	25.6 L	PC Non	Own	D.Ful	Col 54000	5.10	17.1	1.8	Smi Fir
Unit 16.....	120	P 30x5	Wau X	19.6 L	PC Non	Per	Zen	Col 36001	5.55	23.4	1.8	Smi Fir
§ D. S. U.	1650	P 32x4 1/2	Con 20L	28.4 L	PC Non	Per	Zen	Col 36001	5.10	17.1	1.8	Smi Fir
Wachusett S.....	152	P 30x5	Con 8R	4.4x5	PC Non	Own	D.Ful	Col 54000	5.10	17.1	1.8	Smi Fir
Willys Knight T-100.....	130	P 30x5	Own GKA	3.5x5	PC Non	Own	D.Ful	Col 54000	5.10	17.1	1.8	Smi Fir
Corbit 620.....	135	P 32x4 1/2	Con 18E	28.4 L	PC Non	Per	Zen	Col 54000	5.10	17.1	1.8	Smi Fir
Defance Fl.	130	P 30x5	Con S4	28.9 L	FP Non	Per	Zen	Col 54010	5.85	23.4	1.8	Smi Fir
Diamond T77.....	132	P 30x5	Lyc S	25.3 L	PC Non	Per	Zen	Col 54010	5.6	18.6	1.8	Smi Fir
Biederman.....	154	P 32x6	Con 8R	27.3 L	PC Non	Own	D.Ful	Col 36001	5.7	18.7	1.8	Smi Fir
Brookway, Junior.....	130	P 30x5	Wu C	22.5 L	PC Non	G&O	D.Ful	Col 36001	5.10	20.8	1.8	Smi Fir
Clinton 20B.....	153	P 30x5	Wau V	25.6 L	PC Non	Own	D.Ful	Col 36001	5.10	20.8	1.8	Smi Fir
Clydesdale 10A.....	154*	P 30x5	Con 18E	24.5 L	PC Non	Own	D.Ful	Col 36001	5.10	20.8	1.8	Smi Fir
Concord KX6.....	160	P 32x6	Con 18E	24.5 L	PC Non	Own	D.Ful	Col 36001	5.10	20.8	1.8	Smi Fir
Corbit 620.....	135	P 30x5	Con 18E	27.3 L	PC Non	Per	Zen	Col 350008	5.57	22.86	1.8	Smi Fir
Defance Fl.	130	P 30x5	Con 18E	27.3 L	PC Non	Per	Zen	Col 350008	5.10	22.86	1.8	Smi Fir
Diamond T77.....	132	P 30x5	Con 18E	27.3 L	PC Non	Per	Zen	Col 350008	5.10	22.86	1.8	Smi Fir
Graham Brothers, BE.....	995	P 30x5	Dodge	6-3.8x4.1/2	PC Non	Per	Zen	Col 350008	5.10	22.86	1.8	Smi Fir
Graham Brothers, BEW.....	130	P 30x5	Dodge	6-3.8x3.7	PC Non	Per	Zen	Col 350008	5.10	22.86	1.8	Smi Fir
Graham Brothers, BE.....	1065	P 30x5	Dodge	6-3.8x3.7	PC Non	Per	Zen	Col 350008	5.10	22.86	1.8	Smi Fir
Graham Brothers, EW.....	140	P 33x5	Dodge	6-3.8x3.7	PC Non	Per	Zen	Col 350008	5.10	22.86	1.8	Smi Fir
Gramm-Bernstein 01.....	145	P 30x5	Dodge	6-3.8x3.7	PC Non	Per	Zen	Col 350008	5.10	22.86	1.8	Smi Fir
Indiana 11X.....	120	P 30x5	Lyc CT	22.5 L	PC Non	Own	D.Ful	Col 36001	5.10	22.86	1.8	Smi Fir
Indiana 611.....	120	P 30x5	Her OX	4.4x5	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Int. Harvester S-24.....	130	P 32x4 1/2	Con 15C	22.6 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Int. Harvester S-26.....	130	P 32x4 1/2	Con 15C	22.6 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Macor 36.....	140	P 30x5	Lyc S	25.3 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Master 11.....	152	P 30x5	Con 15C	22.6 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Republic 75-6.....	120	P 30x5	Lyc CT	22.6 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Selden Pacemaker 25.....	142*	S 30x5	Con 15C	22.6 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Stewart 16.....	120	P 32x6	Lyc CT	22.6 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Stewart 16X.....	120	P 30x5	Her OX	4.4x5	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
United 20 C6.....	128	P 30x5	Con 12C	4.4x5	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Victor 25.....	131	P 30x5	Con 12C	4.4x5	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
White 57.....	2725	P 33x6	Own GRCC	4-4.5x4	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Woods 20B6.....	120	P 30x5	Con 31L	4-2.8x4.1/2	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
1 1/2 Ton												
§ Aeme 36.....	136	P 32x6	Con 15C	22.6 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Acorn 30-P.....	230	P 30x5	Con 8A	4-4.4x4 1/2	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Amer. LaFrance Chief.....	230	P 30x5	Con 8A	4-4.4x4 1/2	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Armled 30B.....	148*	P 32x6	Con 15C	22.6 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Armled 30-6.....	150*	P 32x6	Con 15C	22.6 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Atterbury 26G.....	145	P 30x5	Lyc 4S	25.3 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Atterbury 26G6.....	145	P 30x5	Lyc 4S	25.3 L	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir
Autocar A.....	142*	P 32x6	Con 31L	4-4.5x5 1/2	PC Non	Per	Zen	Col 36001	5.10	22.86	1.8	Smi Fir

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Trade Name and Model	Front Wheelbase (inches)	Front Tire Size	General	Engine		Clutch	Gearset	Rear Axle		Gear Ratios		Brakes, Location	Front Axle Make and Model	Rear Axle Make	Wheels (Make)	Springs (Make)	Screwing Gear (Make)	Chassis Weight (lbs.)
				Fuel System	Generator and Starter			Revs. Rated HP.	Type	Total Reduction in Low	Total Reduction in High		Final Drive	Final Reduction in	Front Axle Make and Model	Rear Axle Make and Model		
3 Ton—Cont'd																		
King Zeller 62A.....	4000 190	P 34x7	Con 6B	DP34x7	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Kleiber Speed.....	4100 163	P 34x7	Con 14	DS34x6½	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Kleiber Speed.....	1250 163	S 36x5	Bud BUS	S 36x12	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Kline H.....	1250 166	S 36x5	Con 6B	S 36x10	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Lange E3.....	3850 149½	S 36x5	Con 6A	S 36x10	Con 6A				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Lange H.....	140	P 36x6	P 40x10	S 36x10	Her YXC				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Lange H-1.....	165	S 36x5	S 36x10	P 40x10	Her YXB				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Latrabeux XH25.....	173	P 36x6	DPS2x6	Bud YBU1	Bud BUS				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Macarac 64.....	177	S 36x5	DPS2x6	Bud YBU1	Bud BUS				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Macarac 66.....	1360 169	P 36x6	S 36x12	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
National 40.....	1650 179	P 36x6	S 36x12	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
National 41.....	1650 179	P 36x6	S 36x12	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Noble 164.....	165	S 36x5	S 36x10	P 40x10	Her YXC				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Noble 166.....	160	P 36x6	S 36x10	P 40x10	Her YXB				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Oakoshok H.....	175	P 36x6	DPS2x6	Bud YBU1	Bud BUS				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Pierce-Arrow XB.....	177	S 36x5	DPS2x6	Bud YBU1	Bud BUS				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Rehberger B.....	182	S 36x5	Wau CU	P 36x10	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Ro G.....	195	P 32x6	S 36x10	P 36x10	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Republie 25W.....	165	S 36x5	S 36x10	P 36x10	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Republie 65.....	170	P 36x6	S 36x10	P 36x10	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Schaeft HLNW.....	160	S 36x5	P 36x7	Her L	Her L				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Selring D4-64.....	165	P 32x6	S 36x10	P 36x10	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Stewart Is-X.....	165	S 36x5	S 36x10	P 36x10	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Studebaker 70 Spec.....	275	184	B2x6x75	B2x6x75	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
United 40D.....	124	P 36x7	DPS2x7	Her OK	Her OK				W F	10.5	56.2		Tim 1644B	Bud	Smi			
U. S. 31.....	1375	166	S 36x5	S 36x10	Bud EBU-1				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Valley.....	3275	166	S 36x5	S 36x10	Bud EBU-1				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Ward La France 2B.....	165	S 36x5	S 36x8	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Ward La France 2B6.....	3400 165	S 36x5	S 36x8	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Ward La France 2B6.....	275	S 36x5	S 36x8	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Clinton 85-6.....	190	P 36x6	S 36x10	P 36x10	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Clydesdale 4.....	177	S 36x5	DPS2x6	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Defense B3.....	160	S 36x5	S 36x10	P 36x10	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Diamond T K2.....	170	S 36x5	S 36x10	P 36x10	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Diamond T K36.....	4500	160	S 36x5	S 36x10	Wau CU				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Dixie.....	130	P 36x6	S 36x8	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Duplex EF.....	163	S 36x5	S 36x8	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Federal UL.....	191	P 36x7	DPS2x7	Her YXC	Her YXC				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Federal 2K6.....	5000	124	S 36x5	S 36x8	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
F.W.D. M.....	4650	100	S 36x5	S 36x8	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
General Motors K-72.....	4500	160	S 36x5	S 36x8	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Grass Premier 55-6.....	140	P 36x6	S 36x8	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Harvey WHC.....	4250	166	P 36x6	S 36x8	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Hug 90.....	162	P 36x6	S 36x8	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Indiana 136.....	163	P 36x6	S 36x8	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
Indiana 636.....	163	P 36x6	S 36x8	Con 6B	Con 6B				W F	10.5	56.2		Tim 1644B	Bud	Smi			
3 ½ Ton																		
Acme 74.....	173	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Amen 76.....	165	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
American La France Y.....	4950	160	S 36x5	S 36x10	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Autocar H.....	140	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Biederman.....	180	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Clinton 85-6.....	190	P 36x7	DPS2x7	Her OK	Her OK				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Clydesdale 4.....	177	S 36x5	DPS2x6	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Defense B3.....	160	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Diamond T K2.....	170	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Diamond T K36.....	4500	160	S 36x5	S 36x10	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Dixie.....	130	P 36x6	S 36x8	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Federal 2B6.....	191	P 36x7	DPS2x7	Her YXC	Her YXC				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Federal 2K6.....	5000	124	S 36x5	S 36x8	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
F.W.D. M.....	4650	100	S 36x5	S 36x8	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
General Motors K-72.....	4500	160	S 36x5	S 36x8	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Grass Premier 55-6.....	140	P 36x6	S 36x8	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Harvey WHC.....	4250	166	P 36x6	S 36x8	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Hug 90.....	162	P 36x6	S 36x8	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Indiana 136.....	163	P 36x6	S 36x8	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Indiana 636.....	163	P 36x6	S 36x8	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
4 Ton																		
Acme 74.....	173	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Amen 76.....	165	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
American La France Y.....	4950	160	S 36x5	S 36x10	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Autocar H.....	140	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Biederman.....	180	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Clinton 85-6.....	190	P 36x7	DPS2x7	Her YXC	Her YXC				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Clydesdale 4.....	177	S 36x5	DPS2x6	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Defense B3.....	160	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Diamond T K2.....	170	S 36x5	S 36x10	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Diamond T K36.....	4500	160	S 36x5	S 36x10	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Dixie.....	130	P 36x6	S 36x8	Con 6B	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Federal 2B6.....	191	P 36x7	DPS2x7	Her YXC	Her YXC				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Federal 2K6.....	5000	124	S 36x5	S 36x10	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
F.W.D. M.....	4650	100	S 36x5	S 36x8	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
General Motors K-72.....	4500	160	S 36x5	S 36x8	Con 6B				W F	7.75	73.6		Tim 16302	Bud	Fir	6200		
Grass Premier 55-6.....	140	P 36x6	S 36x8	Con 6B	Con 6B													

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Motor Bus Chassis Specifications

Which Are Recommended and Adaptable for Bus Use. See Model in the "COMMERCIAL CAR SPECIFICATIONS"

For Other Chassis Which Are Recommended and in the "COMMERCIAL

MAKE AND MODEL	GENERAL		ENGINE		ELECTRICAL SYSTEM		TRANSMISSION		REAR AXLE		TIRES AND WHEELS		DIMENSIONS (In.)			
	WEIGHT		Make and Model	Bore and Stroke, Number of Cylinders	Cylinder Capacity, Hr. Cap. and Amp.	Generator and Starter, Make	Carburetor, Make	Number of Speeds, Forward Speeds	Gearset	Clutch	TRANSMISSION	REAR AXLE	TIRES (In.)	OVERALL		
	Chassis Only	Chassis with Body												Width		
C.C.F. 508	30	.....	Ha S	6-14x5 1/2	.....	Zen	D-R	12-116	D-B-L	B-L	55	4	Spi	Tim	W
C.C.F. 509 (gas. elec.)	20	.....	230	.....	.....	Zen	D-R	12-180	D-B-L	B-L	55	4	Spi	Tim	W
C.C.F. 601	23	.....	Ha S	6-14x5 1/2	.....	Zen	D-R	12-15	D-B-L	B-L	55	4	Spi	Tim	W
..... 116,.....	18	49.10	8160	180	Con 6B	W1	D-B-L	12-15	D-B-L	B-L	51	4	Blo	Tim	W	
..... 116,.....	22	51.10	9280	205	Con 7T	W1	D-B-L	12-15	D-B-L	B-L	55	4	Blo	Tim	W	
..... 116,.....	20	39.75	4700	142	W1, C	Per	D-R	12-153	D-B-L	B-L	55	4	Blo	Tim	W	
Rockway EB	20	39.75	6350	1500-1550	W1, SU	G&O	Zen	12-153	38	P, B&B	B-L	30	3	Spi	Col 3304	S
Rockway EB	20	41.50	7025	2300-1500	W1, Y	G&O	Zen	12-120	42	D-B-L	B-L	30	5	Spi	Col 5503	S
Rockway EB	26	64.50	7025	1800-1500	W1, H	G&O	Zen	12-120	42	D-B-L	B-L	30	5	Spi	Wia 6721	B
Rockway EB	26	64.50	7025	1800-1500	W1, H	G&O	Zen	12-120	42	D-B-L	B-L	30	5	Spi	Wia 6721	B

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Brockway SW.....	24	4820	6450	2500	173 ²	Wis Y	6-33 ^{1/2} x5 ^{1/2}	Exi	12-220	35	D-B-L	B-L 35	Ros P 3216	Bud	32	28 ^{1/2}	263	68
Brockway JI.....	32	7650	11000	5000	221 ²	Wis H	6-4x5 ^{1/2}	Exi	12-220	32	D-B-L	B-L 35	Ros P 3416	Bud	32	30	343 ^{1/2}	75 ^{1/2}
Clinton 65B.....	32	5825	2725	184	100	Wau H	6-4x5 ^{1/2}	Exi	6-180	30	D-B-L	B-L 35	Ros P 3616	Bud	37	30	288	90
Clinton 65B.....	35	6600	9600	3000	220	Wau 60	6-4x5 ^{1/2}	Exi	12-220	25	D-B-L	B-L 35	Ros P 3616	Bud	40	26	288	90
Concord 1 Bus.....	35	6290	11500	5300	216	Bud B11S	6-4x5 ^{1/2}	Exi	12-220	40	D-B-L	B-L 20	Ros P 3216	Bud	38	28	240	74 ^{1/2}
Corbit SB-60.....	25	3550	5100	1750	138	Con 186	6-33 ^{1/2} x5 ^{1/2}	Per	6-150	40	D-B-L	B-L 20	Ros P 3216	75	Bud	36	27	288 ^{1/2}
Corbit SB-60.....	21	3850	10000	3000	220	Bud B11S	6-33 ^{1/2} x5 ^{1/2}	Per	6-150	40	D-B-L	B-L 20	Ros P 3216	75	Bud	36	27	288 ^{1/2}
Fageol 503.....	18	3850	10000	3000	220	Opt. Con 15C	6-33 ^{1/2} x5 ^{1/2}	Per	6-150	40	D-B-L	B-L 35	Ros P 3216	Bud	37	30	258 ^{1/2}	72 ^{1/2}
Fageol Street Car.....	29	.....	.....	.....	.....	Wau 60	6-33 ^{1/2} x5 ^{1/2}	Per	6-150	40	D-B-L	B-L 35	Ros P 3216	Bud	37	30	317	80
Fageol Dbl. Deck.....	58	.....	.....	.....	.....	Wau 60	6-33 ^{1/2} x5 ^{1/2}	Per	6-150	40	D-B-L	B-L 35	Ros P 3216	Bud	37	30	294	91
Dax-Elder 20.....	20	5300	7800	2500	168	Bud BA6	6-33 ^{1/2} x5 ^{1/2}	Per	12-143	34	D-B-L	B-L 35	Ros P 3216	Bud	34	24	288	90
Dax-Elder 30.....	30	7300	11300	4000	220	Bud BA6	6-33 ^{1/2} x5 ^{1/2}	Per	12-143	33	D-B-L	B-L 35	Ros P 3216	Bud	34	24	288	90
Davy Ave. L.....	25	5850	8530	2780	172 ^{1/2}	Yell EZZ	4-4x6	Exi	12-150	30	D-B-L	B-L 31	Ros P 3216	Bud	25	26	296	71
Fifth Ave. L.....	15	6850	12040	5190	173 ^{1/2}	Yell EZZ	4-4x6	Exi	12-150	30	D-B-L	B-L 31	Ros P 3216	Bud	25	26	276 ^{1/2}	71
Garfield KB.....	21	4400	115000	0000	80	Wiz Y	6-33 ^{1/2} x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	23	71
Garfield CH.....	29	6900	11300	4400	220	Ho S	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	249	77
Fageol Factor Car.....	26	.....	.....	.....	.....	Wau 60	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	342	89
Fageol Factor Car.....	29	.....	.....	.....	.....	Wau 60	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	339	89
Fageol Street Car.....	23	.....	.....	.....	.....	Wau 60	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	340 ^{1/2}	93 ^{1/2}
Fageol Dbl. Deck.....	58	.....	.....	.....	.....	Wau 60	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	347 ^{1/2}	87 ^{1/2}
Dixie Ave. J.....	1/2	.....	.....	.....	.....	Wau 60	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	296	71
Fifth Ave. L.....	15	6850	12040	5190	173 ^{1/2}	Yell EZZ	4-4x6	Exi	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	276 ^{1/2}	71
Garfield KB.....	21	4400	115000	0000	80	Wiz Y	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	23	71
Graham Bros. JD.....	16	3825	6890	3000	162	Dodge	6-33 ^{1/2} x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Graham Bros. JD.....	21	4370	7155	3000	162	Dodge	6-33 ^{1/2} x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Graham Bros. YDX.....	21	4370	7456	3000	162	Dodge	6-33 ^{1/2} x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gramma 363N.....	16	3100	6100	2000	164	Lyte TS	6-33 ^{1/2} x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gramma RA.....	17	5500	8500	3000	184	Lyte TS	6-33 ^{1/2} x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gramma 30.....	21	6200	9200	3000	210	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gramma 31.....	25	6500	9500	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 20.....	17	3650	5000	2000	162	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 26.....	21	3650	5000	2000	162	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	25	3650	5000	2000	162	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA-6	6-4x5 ^{1/2}	Per	12-153	35	D-B-L	B-L 31	Ros P 3216	Bud	35	25	250	86
Gulder 36.....	21	6600	9000	3000	236	Bud BA												